OFFICIAL PUBLICATION OF THE PROCEEDINGS AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

VOLUME 44, NO. 17
AUGUST 15, 1955

AMERICAN DYESTUFF REPORTER

Devoted to Textile Chemistry
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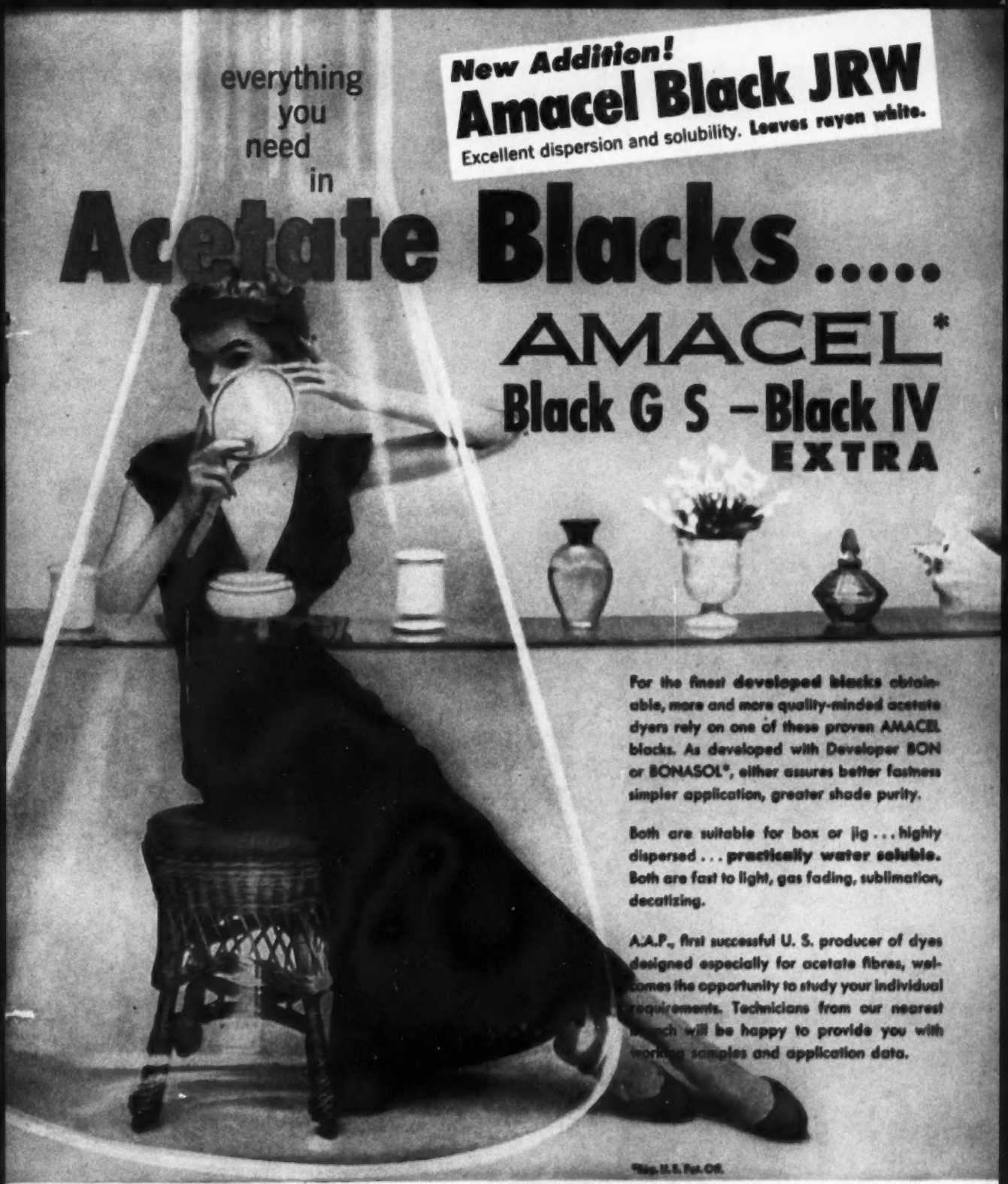
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Sincerely,

Bill

William Caldwell
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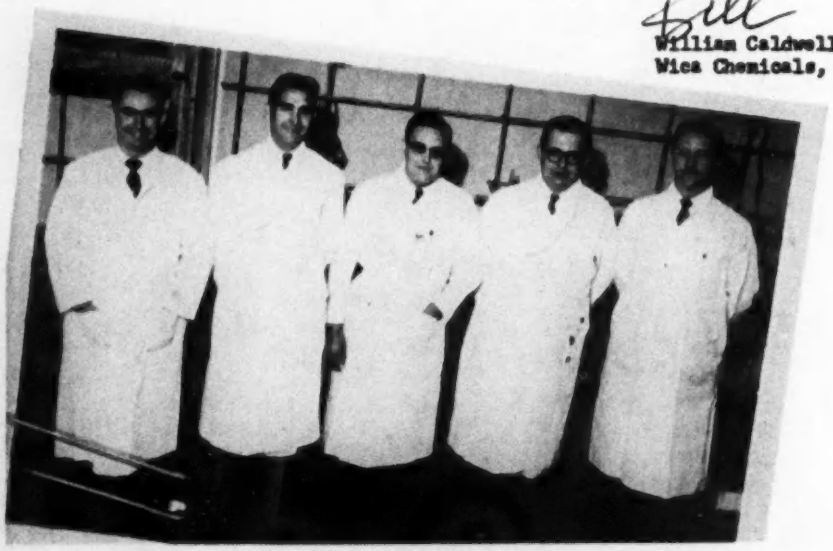

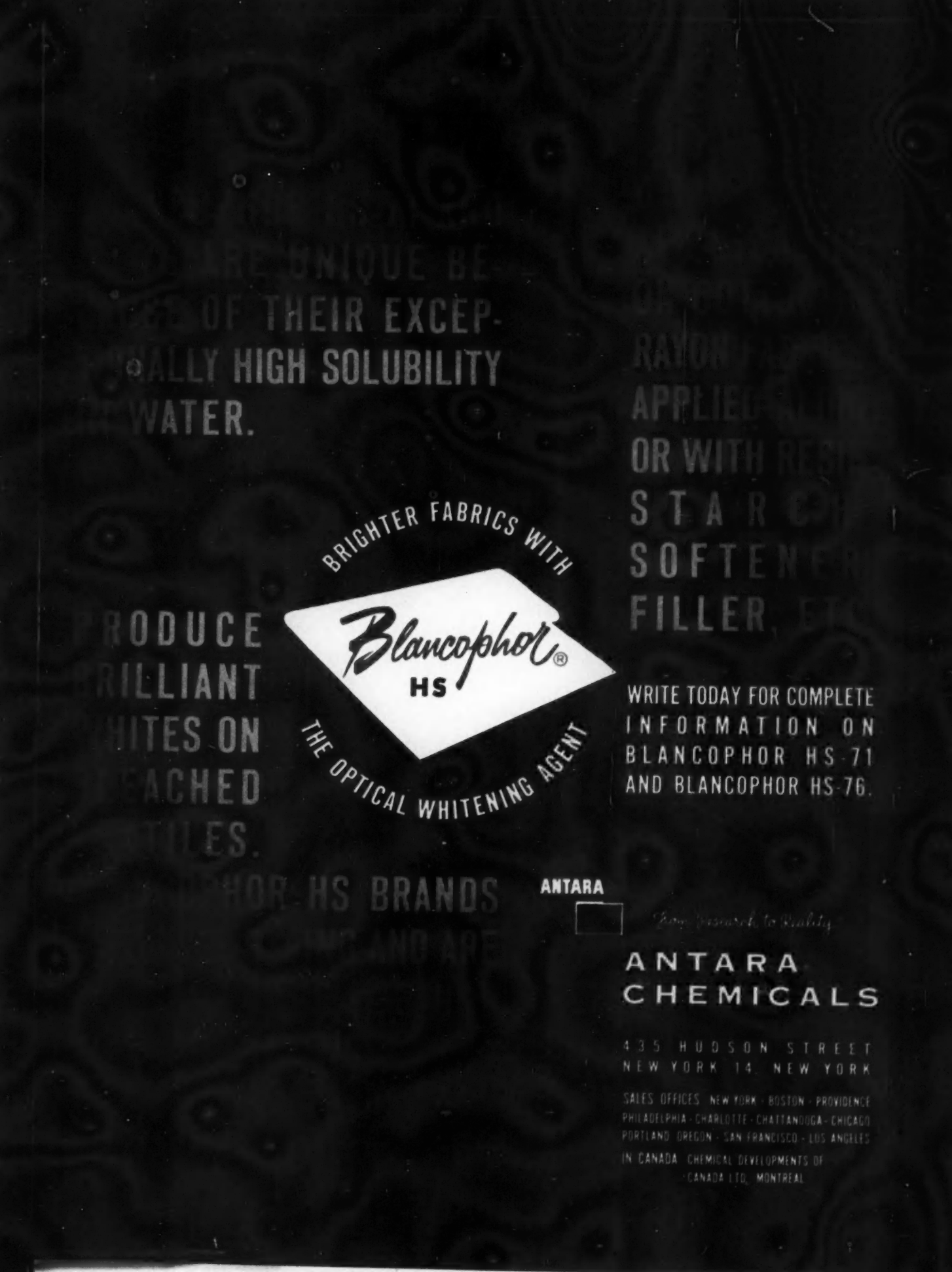
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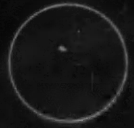

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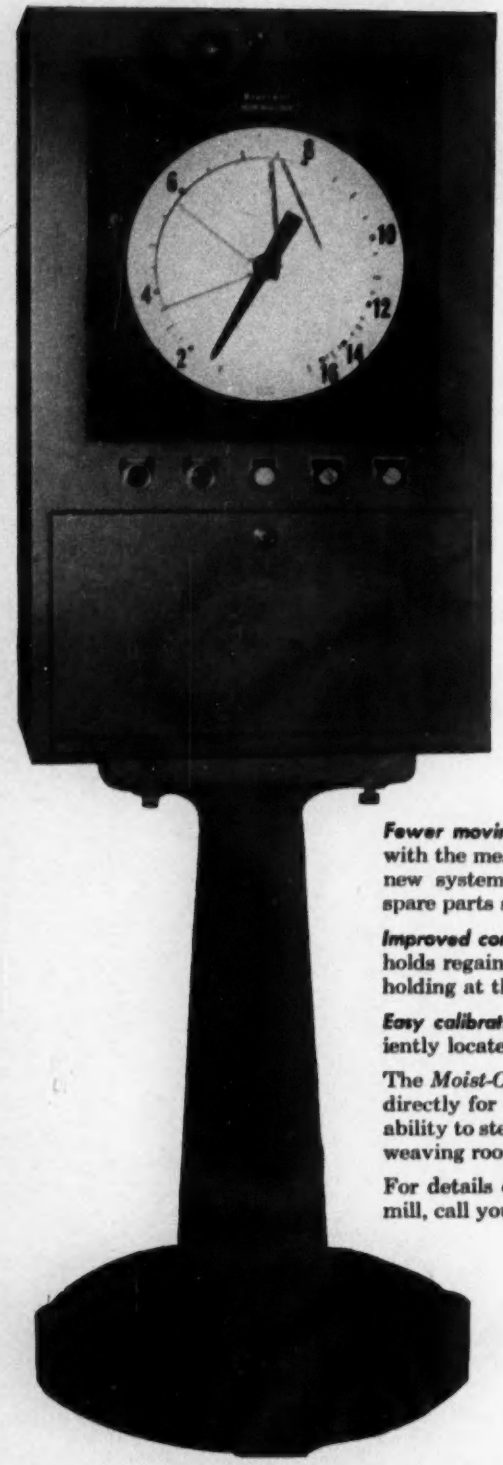

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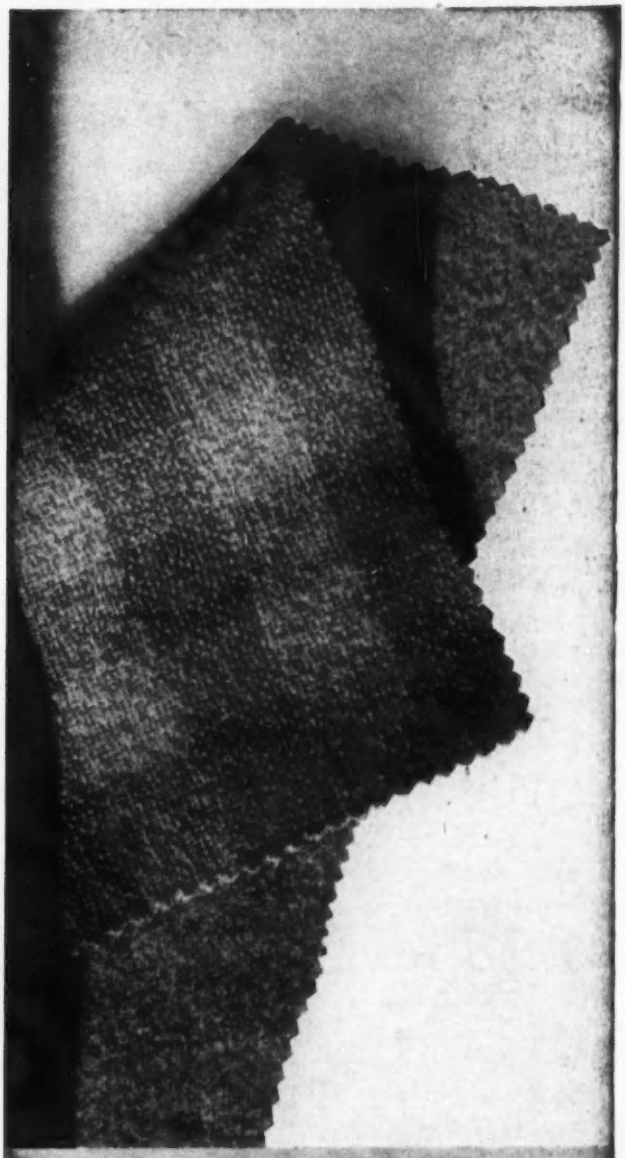

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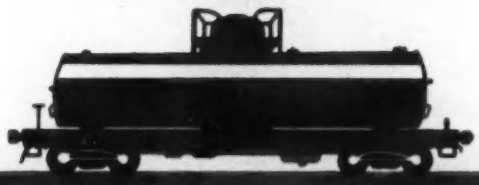

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Devoted to Textile Chemistry
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OFFICIAL PUBLICATION OF THE PROCEEDINGS AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

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Student Chapters

BRADFORD DURFEE TECHNICAL INSTITUTE, CLEMSON COLLEGE, FAIRLEIGH DICKINSON COLLEGE, GEORGIA INSTITUTE OF TECHNOLOGY, LOWELL TECHNOLOGICAL INSTITUTE, NEW BEDFORD INSTITUTE OF TEXTILES AND TECHNOLOGY, NORTH CAROLINA STATE COLLEGE, PHILADELPHIA TEXTILE INSTITUTE, RHODE ISLAND SCHOOL OF DESIGN, UTICA TECHNICAL INSTITUTE

AATCC Newsgram

August 15, 1955

RESEARCH NEWS IN GENERAL

Results of the recent atomic explosion in Nevada on fiber and fabric samples and test panels set out by AATCC will be reported on and demonstrated at the annual Convention and Exhibition Sept 22-24 in Atlantic City. An analysis and commentary will be made by TCR chairman Charles W Dorn at the TCR meeting at 9:30 am Thursday, Sept 22, and actual samples and mannikins from the test area will be shown at a special display in the Textile Dyeing and Finishing Exhibit, which runs concurrently with the Convention on the Lounge Floor of the Chalfonte-Haddon Hall.

George Mandikos, technical manager at AATCC headquarters lab, has now completely taken over for the late Edwin P Johnstone, in directing, supervising and following the progress of laboratory projects. . . . A sufficient quantity of the new Continental Blue Standards has been ordered to enable the Light Fastness Committee to compare the ISO light fastness test method with that of AATCC. The objective is to establish the correlation of dyestuff ratings to light fastness between the two methods.

AT RESEARCH HEADQUARTERS

AATCC President Raymond W Jacoby, ECR Chairman Leonard S Little, TCR Chairman Charles W Dorn and Treasurer Albert E Sampson recently inspected the Association laboratories at Lowell, Mass. In addition to touring the labs, they were also taken on a tour through the Lowell Technological Institute, where they were able to see much of the Institute's equipment available for AATCC use. Part of their time was devoted to examining the test panels exposed to the Nevada atomic explosion. Mr Dorn showed a number of color slides taken at the test site, and accompanied these with very interesting commentary. Attending also were Ernest R Kaswell, Fabric Research Labs, Inc; Demosthenes S Syrmopoulos, Synthetic Yarns Div, D W Rich & Co, Inc; Dorrance Goodwin, LTI Research Foundation; members of the AATCC Research staff; and the following LTI faculty members: Chapin A Harris, Dr Moore, Russel W Ehlers, Henry E Thomas, and Vasilis Lavrakas.

Other Lowell Visitors: Marianne Karrholm, of the Swedish Institute for Textile Research, Gotenburg, Sweden; and Coleman R Caryl, director of the Desert Sunshine Exposure Tests, Phoenix, Ariz. This summer, Mr Caryl has started high-altitude ultra-violet testing at 7,600 feet.

RESEARCH COMMITTEE NEWS

Ernest R Kaswell has been named a member of the Technical Committee on Research. . . . Charles Dorn, chairman of TCR, reports that Wilford Belanger has been named to the Committee on Damage Caused by Chlorine Retention.

AATCC CALENDAR

COUNCIL
Wednesday evening, Sept 21 (Chalfonte-Haddon Hall, Atlantic City, N J); Nov 18, Jan 20 (Hotel Statler, New York, N Y); April 20; June 15; Sept, 1956; Nov 16, 1956; Jan 18, 1957.

NATIONAL CONVENTIONS
Sept 21-24, 1955 (Chalfonte-Haddon Hall, Atlantic City, N J); 1956 (Waldorf-Astoria, New York); 1957 (Boston); 1958 (Chicago); 1959 (Washington, DC)

MID-WEST SECTION
Oct 29 (Bismarck Hotel, Chicago, Ill).

NEW YORK SECTION
Oct 14, Nov 18 (Kohler's Swiss Chalet, Rochelle Park, N J); Jan 27, Feb 24 (Hotel Delmonico, New York, N Y); Mar 23, Apr 27, May 18 (Kohler's Swiss Chalet, Rochelle Park, N J).

NORTHERN NEW ENGLAND SECTION
Oct 14; Dec 9.

PACIFIC SOUTHWEST SECTION
Oct 7, Feb 6 (Gourmet Restaurant, Beverly Hills, Calif); Dec 2.

PHILADELPHIA SECTION
Oct 21 (Penn-Sherwood Hotel); Dec 2, Jan 13 (Kugler's Restaurant).

PIEDMONT SECTION
Oct 29 (Hotel Wm R Barringer, Charlotte, N C).

RHODE ISLAND SECTION
Oct 13, Dec 1 (Johnson's Hummocks, Providence).

SOUTH CENTRAL SECTION
Dec 10 (Hotel Patten, Chattanooga, Tenn).

SOUTHEASTERN SECTION
Sept 10 (Ralston Hotel, Columbus, Ga); Dec 3 (Atlanta Biltmore, Atlanta, Ga).

WESTERN NEW ENGLAND SECTION
Sept 16 (Rapp's Restaurant, Shelton, Conn); Nov 4 (Hartford, Conn); Dec 16 (Rapp's).

EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Post Office Box 28, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the Secretary.

55-12

Education: BS, chemistry

Experience: analytical and experimental chemist, specializing on detergents

Age: 32; married; veteran; references; position in vicinity of New York desired but not essential

8-1, 8-15

55-13

Education: BS, textile chemistry

Experience: Chemist and foreman in bleaching and dyeing department.

Age: 31; married; references; executive position on U S east coast desired.

8-15, 8-29

• First Charles H Stone Scholarship Awarded

THE Charles H Stone Scholarship Fund Committee of the Piedmont Section has anounced the awarding of its first scholarship at North Carolina State College to William Morgan Barnett, Jr, 1422 Mordecai Drive, Raleigh, N C.

A second scholarship will be awarded to a successful candidate from Clemson College. This fund is awarded to a Junior or Senior in textile chemistry and dyeing.

OBITUARY

CARL E BICK

THE passing of Carl E Bick, 55, president of Midwest Processors, Libertyville, Ill, was recently announced.

Mr Bick was the first chairman and a charter member of the Mid-West Section, AATCC, and subsequently served as a Councilor. He was a life member of Murat Temple.

Mr Bick is survived by his widow, Margaret, two sons, Carl G and E Theodore, his parents, Ernest and Elsie, a sister and two brothers.

NOTICE

To Authors and Section Officials

Under a new ruling of the Publications Committee, all papers presented before local sections of AATCC must be submitted direct to the publishers of the AMERICAN DYESTUFF REPORTER, 44 East 23rd St, New York 10, N Y. Two copies of each manuscript should be submitted in accordance with the "Notice to Authors", which appears on P568 of this issue.

CONVENTION TOPICS

The main Convention invitations have gone out to AATCC members, and all are urged to fill out carefully the forms for hotel accommodations, and advance registration, to be sure of comfortable quarters and detail-free arrival at the Convention and Exhibition September 22-24.

Forms should be returned IMMEDIATELY along with registration fees to A E Raimo, John Campbell & Co, 2522 N Broad St, Philadelphia 32, Pa.

• • •

Operation Cue—the recent Atomic explosion in Nevada, and its effect on textiles, as measured by AATCC—will be a main feature of the Convention and the Exhibition. The Technical Committee on Research meeting (9:30 am, Thursday, Sept 22) will concentrate on Operation Cue results, with an analysis and commentary by TCR Chairman Charles W Dorn.

• • •

And on the floor of the Exhibition (Lounge Floor Level) a special AATCC exhibit will show actual fabric results and mannikins direct from Nevada. All in all, the role of AATCC in preparing, setting out and evaluating the test panels and mannikins in atomic explosion will be a source of interest and pride to all attending the Convention.

• • •

One more meeting of the Convention Committee, to work out and discuss up-to-date details, was held last week, August 8, at Beck's Restaurant, Philadelphia, under chairmanship of Frederick V Traut.

Another part of the excellent ladies' program for the Convention period is the serving of coffee and sweet buns in the morning and the 10 am to 10 pm schedule of the Ladies' Hospitality Room, where card games and other activities will be engaged in. In attendance will be two Atlantic City Convention Bureau hostesses.

• • •

Advantages and interesting features of Atlantic City—even outside the famous boardwalk and hotel specialties, the ocean and the beach—will be outlined in a special story on Atlantic City in the August 29th AATCC CONVENTION ISSUE of *American Dyestuff Reporter*, and will also be detailed in folders from the Atlantic City Convention Bureau, to be supplied to members of AATCC.

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Many and varied exhibits are scheduled for the annual Dyeing and Finishing Exhibition, including, among others, the following: surface-active agents, by E F Houghton & Co; complete line of pad-dyeing colors for padding cellulose, acetate nylon and mixed fabrics, by Pad-Dye Corp; radiant heaters and radiant panels and their application to textile finishing, by Edwin L Wiegand Co; resin treatment of dress goods and cotton fabrics, by Rohm & Haas Co; chemical specialties, by Jacques Wolf & Co; the Dri-Smooth finish for cottons, by Cranston Print Works, and many other displays of keen interest to members of AATCC.

Piedmont Section——

RECENT DEVELOPMENTS IN COTTON FINISHING*

GEORGE M GANTZ

Antara Chemicals Division
General Aniline & Film Corporation
New York, N Y

This paper reviews various finishing treatments of broad-woven cotton fabrics with emphasis on recent developments in the field. Wet-processing operations in bleaching, dyeing, or printing are considered in so far as they affect subsequent finishing treatments. One type of finish is designed to modify the hand or appearance of fabrics, such as softness, luster and sheerness. A second type of finish is designed to provide some performance characteristic, such as resistance to abrasion, shrinkage, mildew, rain, fire, or wrinkling. Basic chemical modifications of cotton are briefly mentioned.

INTRODUCTION

MANY of you will recall that only a few years ago New England was considered outstanding for finishing quality cotton fabrics. Millions of yards of cotton woven in the South were shipped north for finishing. Today, the situation is quite different, and many finishing plants in the South have attained a reputation for quality that once was held only by New England plants. All of you that contributed to this great change can be proud of your accomplishment.

The term finishing in this paper is limited to the processing of broad-woven cotton fabrics after bleaching, dyeing, or printing. Actually, about half of all raw cotton consumed in this country winds up as a broad-woven fabric that is finished in one way or another.

The finisher and the textile chemists who back him up with technical help face many problems. Some of these problems can be traced to faults in grey-fabric manufacturing. Other problems of the finisher arise in the various wet-processing steps involved in bleaching, dyeing, or printing. Since the finisher may have some control over these preparatory operations, they will be considered briefly.

1 PREPARATION FOR FINISHING

The trend in cotton fabric processing has been toward high-speed continuous operations. High-speed singeing, 300 to 400 yards per minute, was developed years ago and now offers no difficulties.

Desizing is somewhat of a problem as far as fitting into a continuous high-speed operation. A certain time must be allowed for enzymatic degradation of starch. The use of higher temperatures for more rapid desizing is limited by the heat stability of the enzymes. Various solutions to this problem have been devised. An enzyme derived from bacteria, used in a salt solution of neutral pH with a nonionic surfactant at a temperature of 160°F, is probably the best process available at present. However, both the finisher and the dyer must be on guard against poorly desized goods. The use of synthetic polymers in place of starch, which is now being considered for reasons of pollution control, may simplify this desizing problem (*1*).

The continuous peroxide bleaching process is no longer considered new, but it can get out of control once in a while. The caustic J box treatment, by itself, is not so effective as a kier boil in removing noncellulosic matter from cotton, and maximum times and temperatures are recommended. It is also important to wash all the caustic out of the goods before they enter the peroxide bath. Hot-water, tensionless washers, of course, are much superior to the old cold-water tight-strand log washers.

The peroxide units of continuous bleaching ranges not only bleach but give a further reduction of noncellulosic matter. However, these units occasionally cause resists and rub marks that are attributed to silica deposits in the J box. Careful control of the caustic-silicate ratio in the saturator will minimize these deposits, and some plants have found that organic sequestering agents are helpful. Sequestering agents of the EDTA type are also beneficial in minimizing catalytic peroxide decomposition by traces of iron or copper in the water supply.

Mercerizing is a very important process as far as the finisher is concerned because it provides luster and aids in fabric stabilization. Mercerizing in the grey instead of after bleaching is preferred by some plants for obtaining better finished widths and lower working losses.

The finisher wants to start with goods that are evenly bleached, uniformly absorbent, neutral, and free of residual chemicals. White goods from the bleach house usually meet these requirements when all the wet-processing steps are under control.

Dyed and printed goods are almost always scoured before drying to remove loose color, print gums, or to develop full shades. Scouring with a fast-rinsing nonionic-type detergent is recommended. No residual caustic, soda ash, or even bicarbonate should be left in vat-dyed goods. If chrome and acetic acid are used for oxidation, they must be thoroughly rinsed out. It is essential to wash out print gums that might have an adverse effect on hand. Goods that are to be resin-treated should be carefully inspected and tested for pH. Redyeing or topping may not be practical after resin treatment. A neutral pH is necessary to permit proper functioning of the resin catalysts.

We can group almost all finishes into two classes. The first class is designed to modify the appearance or feel of the fabric. Such finishes are important at the point of sale but usually last no longer than the first wash. The second class of finishes is concerned with performance in use and may be quite invisible. These finishes may be durable or nondurable. It is unnecessary to point out how important these performance finishes are to cotton. It is certainly by means of such finishes that cotton has met and will continue to meet competition with other fibers.

Ironically, the very ruggedness and washability of cotton makes it quite difficult to develop a truly durable finish. The consumer expects many cotton items to withstand 50 or more wash and wear cycles. Commercial laundries know that a hot alkaline soap solution with plenty of mechanical action will get cotton clean with no apparent damage. How much chance does a finish have, particularly a fiber-surface treatment, under these conditions?

* Presented at the Hotel Poinsett in Greenville, S C, on Saturday, January 29, 1955. Some of the material in this paper has been published previously under the title "Modern Finishing of Cotton Fabrics" in *Canadian Textile Journal* 72, No. 3 (Feb 25, 1955).

II FINISHES AFFECTING APPEARANCE

BLUING AND OPTICAL BRIGHTENERS——When white goods are to be finished, it is customary to add a bluing along with the other finishing materials. In some cases, the finish and bluing will be applied to wet goods after bleaching and before drying. Dress and shirting fabrics, however, are usually can-dried after bleaching, padded with finish before tentering and finally Sanforized. Vat pigments are preferred for bluing quality fabrics because of their excellent lightfastness. Optical brighteners can be used in this operation, but they have a number of disadvantages, such as poor solubility, poor lightfastness, and poor efficiency under incandescent illumination. It has been found, however, that a combination of vat pigment and optical brightener overcomes most of these objections and adds a brilliance to the finish not attainable with pigments alone. A new brightener, Blancophor HS, has been developed recently with excellent efficiency and very good solubility that is particularly suitable for this application. Optical brighteners are also useful for finishing pastels and colored yarn goods. In the case of colored yarns, as it is not always possible to get a good bleach on the white portions, a brightener is very helpful.

It is suggested that the amount of bluing or brightener on white cottons be kept as low as possible. Too much bluing reduces reflectance as well as causing a change in hue. Optical brighteners do not reduce reflectance, but they have other disadvantages when used in excess. Too much bluing on shirting fabrics can give trouble in that fused collars will not have the same appearance as the body of the shirt. Any finisher that tries to cover up poorly bleached fabrics is taking a chance.

PRESERVATION OF LUSTER——As mentioned earlier, luster in cottons is developed by mercerizing under tension. It is the responsibility of the finisher to select finishing materials that do not diminish luster. Considerable variation may be found in the opacity of various starches and gums used in the finishing. Softeners have less dulling action than the film formers, but in this case some care must be given to discoloration.

MECHANICAL TREATMENTS (NONDURABLE)——The art of calendering cotton fabrics has declined considerably in recent years. One reason is that compressive shrinking is now required on most wearing apparel, and another is the advent of durable finishes. Nevertheless, the friction, Schreiner, and chase calenders can produce a variety of finishes on cotton affecting appearance as well as hand. Organdies and dotted swiss may be finished on a swing frame. Napping and brushing are required on suedes and flannels. These treatments are all quite old and do not have the glamour of the newer chemical finishes.

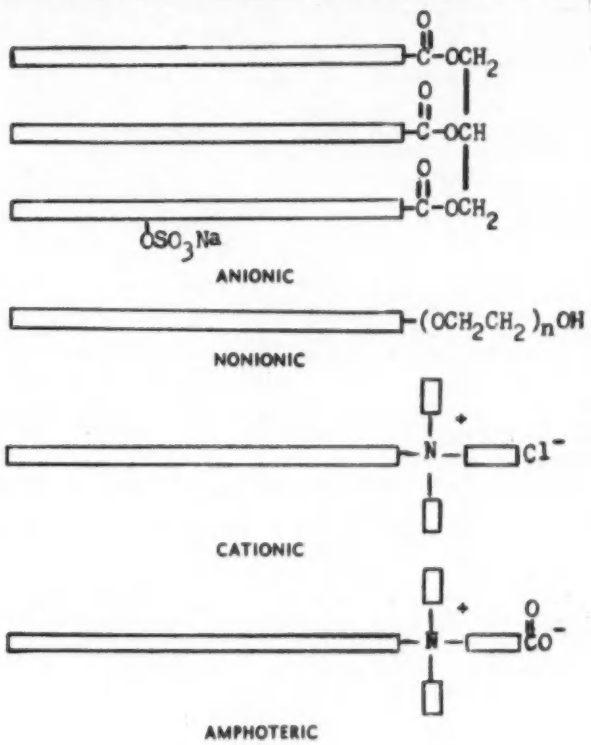


Figure 1
Typical cotton softeners

III FINISHES AFFECTING HAND

SOFTENERS——The variety of hands produced on different cotton fabrics or even on the same fabric is almost endless. Even more amazing is the fact that an experienced finisher will produce the required variety of hands with only five or six products. That is not to say that the textile chemical manufacturers have not offered the finisher enough products. Hundreds of softeners have been compounded and offered as cotton finishing agents *(2)*. Figure 1 illustrates the structure of typical cotton softeners. Sulfated oils and sulfated tallow are the most common softeners and make up by far the largest volume. Sulfated oils are particularly effective for producing very soft, silky hands on fine-combed-yarn fabrics. The manufacture of a good-quality finish of this type requires a very careful balance between degree of sulfation and degree of unsaturation. Highly sulfated products are poor softeners, and highly unsaturated products are prone to yellow and develop rancid odors on storage or at high temperatures. The ordinary petroleum sulfonates are not very effective softeners, probably because of their branched chain structure. However, one very efficient softener (i.e, Avitone A) is a hydrocarbon sulfonate.

Sulfated tallows are widely used as cotton softeners because they are cheap and quite effective as starch plasticizers. These softeners produce a hand that is drier, waxier, and fuller than the sulfated oil finish. It is believed that sulfated tallows comprise the largest tonnage in the field of cotton softeners.

Cationic softeners have never been widely used on cotton fabrics except in conjunction with resin finishes. Since most of them are based on stearic acid, they produce a full hand similar to the tallow softeners. Although they are more effective per unit weight as softeners, this does not offset their much higher price. Cationic softeners are substantive to cotton, but they do not have sufficient durability to withstand a heavy-duty cotton wash. The substantivity feature is not an advantage in application to cotton since very few cotton fabrics are processed in long liquors. Other disadvantages of the cationics are incompatibility with anionic materials, lack of plasticizing action on starches and gums, adverse effect

on many dyestuffs, and slight but definite chlorine retention.

A new type of softener, Soromine AT, which is amphoteric in nature, has recently been introduced to the textile trade. This product overcomes many of the drawbacks of the cationic softeners, and its substantivity can be controlled by adjustment of pH. Its softening action is quite efficient, but it gives a fuller hand than the sulfated oils. It is highly resistant to yellowing at high temperatures and exhibits good compatibility. Particular advantage is taken of its amphoteric nature in pressure-machine application, where it can be uniformly distributed throughout the goods and then exhausted by acidification.

STIFFENING AGENTS——The list of typical stiffening agents that have been used or suggested for cotton fabrics in Table I is quite brief, but it does illustrate the variety of materials available to the finisher. Starches and their simple conversion products have been used for many years and are still the most important for adding stiffness or body to cottons. Protein materials tend to discolor whites and impart odors, so they have not been widely used as cotton finishes. Water-soluble gums are used to a limited extent as finishes for a specific hand (*3*).

Alkali-soluble cellulose derivatives were used extensively during the last war as finishes for certain military fabrics, but their present use is rather small. Water-soluble cellulose derivatives have been examined as finishing materials, but they cannot compete with starch except in special cases. It should be mentioned that many of the materials not extensively used as cotton-fabric finishes have found other applications in the textile industry, such as finishes for other fibers, sizing agents, printgum thickeners, ribbon finishes, etc.

As a general rule, water-soluble polymers containing hydroxyl groups can be made more or less durable as finishes by means of formaldehyde or formaldehyde resins. Insolubilization of the polymer occurs by cross-linking, and some bonding may take place with surface hydroxyl groups of the cotton. Carboxyl-containing polymers, such as algins, pectins, carboxymethylcellulose, polyacrylic acid, and the copolymer of methyl vinyl ether and maleic acid, can usually be insolubilized by precipitation as heavy-metal salts. Little use is made of such a process because the polymers are expensive, a two-bath process is required, and the insoluble salts are not exceptionally durable.

Thermoplastic-resin latices, especially polyvinyl acetate, are being used to a considerable extent as finishes. Polyvinyl acetate forms a semidurable film that gives a desirable body to cotton fabrics and also improves wear and abrasion. Actually, polyvinyl acetate can compete with starch in adding fullness to fabrics on a strict money-value basis. These finishes require only conventional drying. In very stiff finishes, these latices give rather leathery hands that are not particularly desirable (*4*).

TABLE I
TYPES OF STIFFENING AGENTS

Starches:	corn, potato, wheat, etc
Converted starches:	thin-boiling, British gum, dextrine, ethers
Proteins:	gelatin, casein, zein
Natural gums:	arabic, tragacanth, locust bean, algins, pectins
Cellulose solutions:	xanthate, cuprammonium, zincate
Cellulose ethers:	methyl, hydroxyethyl, carboxymethyl
Synthetic:	polyvinyl alcohol, polyacrylic, vinyl ether-maleic copolymer
Thermoplastic:	polyvinyl acetate, alkyds, acrylates, polystyrene
Thermosetting:	urea-, melamine-formaldehyde polymers

Thermosetting resins based on urea or melamine formaldehyde that are polymerized sufficiently to reduce fiber penetration and yet remain water soluble are quite effective as fabric stiffeners. Undoubtedly, the greatest use of these products is modifying the hand of resin finishes for crease resistance. Acid colloids of melamine resins are also useful for producing stiff durable finishes on cottons (*5*). These nitrogen-containing materials have certain disadvantages as finishes for cotton that will be discussed later.

Mention must be made of the Heberlein finishes widely used on certain types of cottons, such as marquisettes. The effects are obtained by the use of strong caustic or strong acid solutions that actually modify the fiber surface. These finishes are not new.

IV FINISHES AFFECTING END-USE PERFORMANCE

ABSORBENCY——Most bleached and dyed cotton fabrics have adequate absorbency for finishing and processing. Some types may require so-called Sanforizing oils to promote even and rapid moisture take-up. Other fabrics require good absorbency because of their end use. It might be thought that any good wetting agent padded on the goods would be satisfactory. This is not true because many wetting agents are poor rewetters. The structural requirements for a good rewetting agent are not well understood. Another problem often encountered is that many agents do not retain their rewetting action on storage. As a class, certain sulfonated esters are most effective for this application, such as "Deceresol OT" (Cyanamid), "Nekal WS or NS" (Antara) and "Triton GR-5" (Rohm & Haas).

ABRASION RESISTANCE——Cotton fabrics have always been considered good for abrasion resistance and long wear life. With the advent of nylon and other synthetic fibers, much higher levels of abrasion resistance are known, and ordinary cotton fabrics now rate as fair. Many finishes can be applied to cotton to improve its abrasion resistance, and, as noted earlier, thermoplastic resins are particularly effective. One difficulty that the textile chemist and finisher has to face is selection of an abrasion tester that will correlate with actual wear (*6, 7, 8*).

One new development in this field is the discovery made at the Southern Regional Research Laboratory that butadiene-acrylonitrile copolymers (nitrile rubber) are effective as durable, abrasion-resistant finishes (*9*). On denim fabrics, at least, size-box application is most practical, and latex-sized yarn weaves satisfactorily. The retention of abrasion resistance of the treated fabrics after many launderings is excellent. It is too early to tell how far this development will go, but there are many cotton-fabric end uses where improved abrasion resistance is important.

SHRINKAGE RESISTANCE——One of the greatest assets of woven cotton fabrics is dimensional stability. When a fabric is properly relaxed, it remains stable without stretching or shrinking in normal use. Not only weaving but subsequent processing in the bleachery and dyehouse impose warp strains on fabrics. Can-dryed fabrics reaching the finishing department are invariably stretched in the warp direction and overshrunk in width. By wetting out fabrics and over-feeding on a pin or clip frame, it is possible to achieve a *preshrunk* condition. However, the most efficient device for setting cotton fabrics to within 1% of their final washed dimension is the compressive shrinking machine known as the Sanforizer (*10*). This machine can handle fabrics at speeds of 100 yards per minute and higher.

Cotton fabrics can also be set at definite widths and lengths by means of cross-linking agents, such as formaldehyde and aldehyde resins (*11*). In this case, the fabric is stabilized at the width and length it has in the drying and curing steps. It is therefore possible, by this method, to obtain greater yardage return. Economic considerations of using resins versus Sanforizing usually favor the latter process. Furthermore, resin treatments have certain disadvantages, which will be discussed later, and apparel fabrics set beyond their "zero" dimensions with resins invariably show progressive shrinkage in 10 to 20 launderings.

From the finisher's standpoint, working loss is a very important subject. He is caught between grey mills that can weave goods with very high warp shrinkage and the converter that requires a 97% return with no more than 1% residual shrinkage. Mercerization under proper conditions is

particularly important in eliminating much of the potential shrinkage of cotton fabrics and minimizing working loss.

MILDEW RESISTANCE ——— Cellulosic materials including cotton fabrics can be decomposed by either fungi or bacteria (*12*). The term mildew resistance is used broadly to include both phenomena. Compounds of mercury, copper, zinc, and chlorinated phenols are widely used for their mildew-resistant action.

Pentachlorophenol and dihydroxydichlorodiphenylmethane are outstanding among the chlorinated phenols. The latter compound has fairly good leach resistance and is specified on a number of military fabrics. Organic mercury compounds, such as phenyl mercuric acetate and pyridyl mercuric acetate, are very effective, but they must be used with care because of their toxicity.

Copper compounds, such as copper naphthenate, have been used for many years in tentage and canvas fabrics. Perhaps the most outstanding compound for fabrics subject to outdoor weathering is copper-8-quinolinolate. This product is available in both aqueous and solvent dispersions. As copper compounds are colored, they are not often used in fabrics for wearing apparel and household purposes.

Cottons treated with melamine- or urea-formaldehyde resins show good resistance to soil-burial tests (*13*). Cotton chemically modified by acetylation, cyanoethylation, phosphorylation, etc, always has mildew resistance if sufficient reaction is obtained. These treatments, furthermore, are quite durable to soil burial and outdoor weathering.

ULTRAVIOLET RESISTANCE———It is generally agreed that the small amount of ultraviolet rays in solar radiation (below 4000°A) is responsible for cellulose decomposition upon outdoor exposure. Any material that can screen out this ultraviolet radiation will improve the outdoor weathering of cotton fabrics. Mildew resistance is also necessary for fabrics exposed to weather. In the case of cotton duck treated for fire, water and mildew resistance, it has been postulated that the pigments used for coloration in the finish actually screen out ultraviolet rays and thereby contribute to the weathering resistance of the treated fabric (*14, 15*).

Most ultraviolet screening agents available in the past have broken down chemically and lost effectiveness upon exposure. Recently, stable ultraviolet absorbers have been developed which are effective in many varnishes, lacquers and plastics, such as Absorbers 1, 9, and 12 of American Cyanamid Co and Uvinuls 400 and 490 of Antara Chemicals. Considerable work is now being directed toward the use of these compounds in textile finishes. As soon as a suitable finish is found, cotton fabrics can be treated to have much better outdoor-weathering resistance.

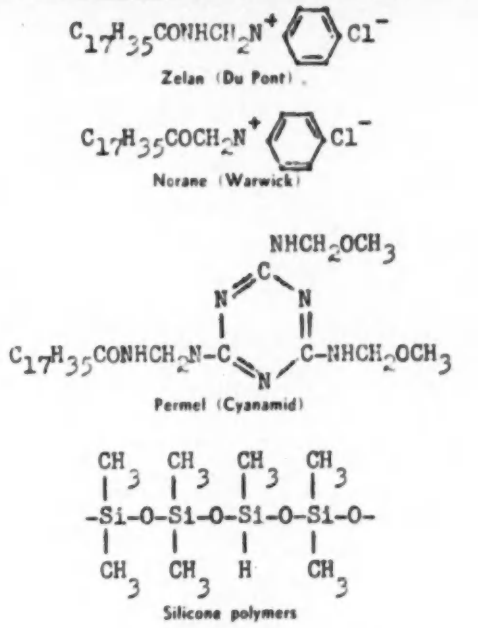


Figure 2
Possible structures for durable water repellents

WATER RESISTANCE———The water resistance of cotton fabrics is dependent upon both the fabric structure and the finish applied. Research sponsored by the Quartermaster Corps of the U S Army has provided a much clearer picture of the fabric-structure factors that provide good rain resistance. The finish itself should provide a coating around each fiber that is water-repellent. In the case of nondurable water repellents, paraffin waxes suitably emulsified are generally used. Some improvement in the wash-fastness of these products is obtained by the incorporation of aluminum and zirconium salts. These may function both by improving the adhesion of wax to cellulose and by forming insoluble salts with the ammonium soap emulsifiers.

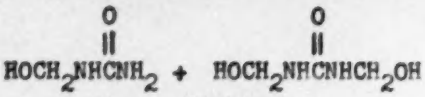
More durable finishes are obtained by using highly insoluble stearic acid derivatives, such as methylol stearamide, suitably solubilized or dispersed. Possible structures for the durable water repellent types are shown in Figure 2. After padding and drying, these finishes are cured at fairly high temperatures. According to Davis, about 1-2% of stearamidomethylpyridinium chloride applied as Velan PF reacts with cellulose, whereas the rest is deposited as highly insoluble methylenedistearamide (*16, 17*). Both Norane (Warwick Chemical Company) and Zelan (DuPont) have a pronounced softening action on fabrics, whereas Permel (Cyanamid) and the silicones have less effect.

Silicones are the latest entrants in the water-repellent finish field. Their mode of action is quite different, since they contain no fatty groups. Their action as water repellents may be likened to a plastic film which surrounds each fiber. As a class, the silicones seem to be more effective on synthetic fibers than on cotton. This field is quite active, and modified formulations may be expected that are particularly suitable for cotton fabrics.

The use of water repellents in resin finishes to provide spot resistance has become popular, and all the durable types seem to be applicable. In fact, it is now possible to obtain resin formulations with the spot-resistant feature incorporated by the manufacturer.

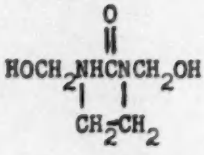
FLAME RESISTANCE ——— The man-hours and research dollars that have gone into durable flame-resistant finishes must be tremendous, yet no completely satisfactory finish is available. The chlorinated wax-antimony oxide treatments that serve very well on canvas and paulins are not suitable for fine fabrics. A high add-on is required, the hand is unpleasant, and the durability is not adequate for normal cotton-laundry practice.

The treatment of cotton with phosphoric acid and urea followed by high-temperature curing produces excellent flame resistance.

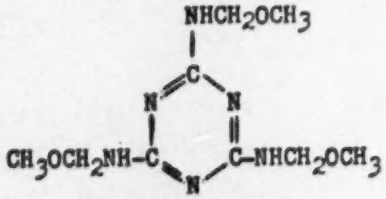


Urea-formaldehyde condensate

Methylated dimethylolurea



Dimethylol ethylene urea



Methylated trimethylolmelamine

Figure 3
Resin structures

Notable improvements in this type of finish were developed by Joseph Bancroft and Sons. The disadvantages of these finishes include the yellowing of whites, changes in shade of dyes, loss of tensile strength and poor resistance to alkaline washing and sea water.

Two new developments along this line are the Pyroset finishes of American Cyanamid Company and the THPC Process developed by the Southern Regional Research Laboratory (*18*). In Pyroset finishes the nitrogeneous component is a melamine resin, which can react with the cellulose as well as the phosphorus. This reduces alkaline hydrolysis or loss of nitrogen in scouring with consequent improvement in durability. The same observations apply to the THPC, tetrakis(hydroxymethyl) phosphonium chloride, process. An inherent difficulty of these processes, aside from the effect on hand, is that an adequate time and temperature of cure for optimum durability and phosphorylation of the cotton invariably result in loss of strength. In retrospect, however, the nitrogen-phosphorous durable flame-resistant finish has come a long way in the last ten or fifteen years.

A different approach to durable flame resistance, developed by DuPont and National Lead, involves the deposition of antimony and titanium oxides within cellulose fibers. These finishes are quite resistant to alkaline washing and do not require excessive add-ons. Disadvantages include the need of corrosion-resistant equipment for application, pronounced afterglow, dulling of dyed fabrics, and sensitivity to fluoride laundry sours.

The modern theory of flame resistance postulates the need for a catalyst to direct the thermal decomposition of cellulose into carbon and water plus a quenching gas to prevent the ignition of such volatile, flammable tars as are produced. Ammonium phosphate is a good example of a compound meeting these requirements. In the case of chlorinated paraffin and antimony oxide, the latter serves as a catalyst, whereas the former supplies HCl as the quenching vapor.

The newest and perhaps most promising approach to a durable flame-resistant finish for cotton is the use of polymers containing phosphorous and bromine. Typical would be a brominated allyl phosphate polymer in latex form suitable for padding. This development is being sponsored by the Quartermaster Corps, but precise details have not been released. It is evident that more work must be done before commercial production is reached, but it is quite certain that satisfactory finishes can be obtained meeting all military requirements for durability and wearing-apparel use. The chemical cost is expected to be high.

CREASE RESISTANCE——This subject is very complex and involves very many factors such as fabric structure, cost, hand, durability, chlorine retention, etc. The equipment used for processing is an important factor and often the finisher's greatest problem is to find optimum conditions for the machines he has available. To understand the importance of fabric structure, it may be well to review the process from a fiber standpoint (*19*).

Cotton fibers are highly crystalline and show about 5% elongation at break. When thermosetting resin monomers are padded and dried on cotton they penetrate the fiber and polymerize inside and also crosslink the adjacent chain-like molecules. The fiber now has a lower elongation and lower breaking strength. Chemical bonding of adjacent molecules restricts their elongation much more than the usual hydrogen bonding. Hence when a load is applied to the fiber it will be distributed among fewer molecular chains and a break occurs at a lower value. However, if the crosslinking agent is removed, the original elongation and strength of the fiber returns.

Rayon is less crystalline than cotton and has a much greater elongation of 16-20%. Therefore, it does not suffer the same loss of tensile strength upon resin treatment. Linen, on the other hand, is even more crystalline and less extensible than cotton and it undergoes an even greater loss of strength. Resinated linen behaves much like an unlubricated glass fabric and can only be handled on rolls because piling in boxes cracks the fabric. A patented after-mercerizing treatment will restore elasticity to resin-treated linen (*20*). The term *embrittlement* has been given to this loss of extensibility, tensile, and tear strength which crosslinked fibers exhibit.

In most cotton fabrics filling yarns are fewer in number, of poorer quality, and often have a lower twist than warp yarns. The filling, therefore, is weaker in both tensile and tear strength. After the fabric has been pulled around the bleachhouse for several miles, mercerized under tension, and finally can-dried under tension, the situation is even worse. An 80x80, 4.00-yard print cloth, for example, may arrive in the finishing department with a count of 90x70. Most of the crimp will be in the filling, and during the padding and drying operations the filling absorbs much more than its share of the resin. Consequently, the filling shows greater embrittlement.

It is important to use fabrics that are properly designed for a crease-resistant finish. It has taken textile manufacturers a long time to learn this, and poor fabric structure may be one reason why the resin treatment of cotton lagged so far behind the treatment of rayon.

If it is assumed that a properly designed fabric is available, that it has been evenly

dyed, and that it has been thoroughly rinsed, consideration may be given to resin selection. Although many resins have been developed and tested for this application, the four shown in the Figure 3 may be considered typical.

The main advantage of the UF resins is their low cost. They give a soft, somewhat full and sandy hand, which can be varied by the use of softening and stiffening agents. The durability of the UF resins is fair, they cause considerable loss in tear strength, and they should not be used on white goods that might be given a chlorine bleach in laundering. These resins are usually shipped as 60% pastes, which have a limited storage life (*21*). The resin padding solutions should be made up just before use.

The melamine-formaldehyde (MF) resins can be used at lower concentrations than the UF types for the same degree of crease resistance and are somewhat better for durability. These resins are more expensive and have no advantage as far as chlorine retention is concerned. It is claimed that the loss of tear strength on cotton can be greatly reduced by the means of thermoplastic resins added to the pad bath (*22*).

The methylated urea-formaldehyde resins now available have somewhat better storage life but are otherwise similar to the UF resins on cotton. They have been found useful for production of glazed chintz. Dimethylol ethylene urea is typical of the new resins designated as reactant types. This resin can form only linear, water-soluble polymers so its function is thought to be mainly crosslinking. This type of resin produces good crease resistance on cotton and has a very low chlorine retention.

The selection of catalyst is also important for producing the best results on cotton fabrics. Diammonium phosphate and ammonium chloride are typical of the latent catalysts that have been used for many years. However, the formaldehyde present in the resin solution can react with ammonia from the catalyst to form hexamethylene tetramine. The pH of the bath drops and premature resin polymerization may occur. Organic amines have been developed which do not react with formaldehyde, such as the Catalyst AC Series of the Monsanto Chemical Co. When their salts are used as catalysts, greater bath life is obtained; however, they are weaker catalysts. Organic amines with strong catalytic activity have also been developed, such as Catalyst G8 of Rohm & Haas and Catalyst AC-6 of Monsanto. Cotton is more subject to acid damage from strong catalysts than rayon.

A recent development for MF resins is the use of an inorganic-salt catalyst. In this case curing occurs at a higher pH, less chlorine retention is observed, and there is less chance of odors developing in the treated goods (*23*).

The preparation of the resin bath is not critical, but more care must be used than is normally given to boiling up a starch finish. A constant-level control on the pad box is recommended so that the fabric always has the same immersion time. It is desirable to have maximum immersion time of the fabric in the solution and maximum expression at the nip. A three-bowl pad permitting a double dip, double nip is preferred, and the rolls must be kept in good condition.

Drying is the most critical step in resin application. Rapid drying causes migration of resin to the surface, which results in stiffness, sandiness, and lower tear strength. Tenter frames are invariably used for drying, and an overfeed unit is useful on many fabric types. High temperature and high air velocity both promote migration. The optimum production speed consistent with good resin performance has to be determined for various fabric weights. Preheating devices, such as infrared units or a few cans are useful for bringing the wet fabric up to drying temperature. Overdrying should be avoided. In all cases 5% moisture should be left in the goods, and for fabrics to be glazed or embossed, 10-15% is required. It is possible in the case of very light goods to dry and cure in one operation on the frame.

The time and temperature of the curing step will vary with the resin, the catalyst, and the type of machine used. At 300°F a time of 4-5 minutes is required, whereas at 340°F the time will be 2 minutes or less. In all cases it is desirable to get a good tight cure for maximum crease resistance, maximum durability, and minimum chlorine retention.

Cotton fabrics should always be washed after curing to remove unfixed resin, catalyst, and to minimize the danger of odor development. A three- or four-box open-width soaper is satisfactory with a detergent and soda ash in the first box. It is essential to rinse thoroughly, particularly in the case of spot-resistant finishes where no residual detergent can be tolerated. The final drying is not important except in regard to residual shrinkage. The finished width is usually slightly under the width in the curing step.

The term *crease resistance* has been used in its broadest sense. In a strict sense it refers only to the ability to resist creasing or wrinkling, and *crease recovery* would cover the other important factor. It is possible to enhance the ability of a fabric to resist wrinkles by adding a stiffening agent. Such a stiffening agent may also improve breaking strength and abrasion resistance, but it usually lowers tear strength and crease recovery. It is not advisable, therefore, to use more than a minimum of stiffening agent. Thermosetting UF-polymer syrups, thermoplastic-resin emulsions, or water-soluble polymers that can be crosslinked are all used for this purpose.

It is common practice to add a softener to the resin formulation either for its effect on hand or for its effect in minimizing tear-strength loss (*24*). Crease recovery in this case does not drop and may increase. These softeners, whether anionic, cationic, or amphoteric, must be selected with care. They should not yellow in the curing step, they must not cause poor bath stability, they should have some durability to washing, and they should not add to the chlorine-retention problem.

DURABLE CALENDER EFFECTS——The process of imparting a durable glazed or embossed pattern to cotton fabrics may be considered as a variation of the crease-resistant treatments discussed above (*25, 26*). After padding and drying, but before curing, cotton fabrics are passed through calendar rolls maintained at 350°F. All the factors important in crease-resistant finishes also apply to durable calender finishes plus a few more.

In this process it is very essential to dry the fabrics carefully to about 12% moisture content so that no polymerization or reaction of the resin takes place. The resin formulation must contain sufficient softener or lubricant to prevent pick-off on the heated calender rolls. This is particularly true in the case of the Schreiner calender, where the engraving is very fine. More than one pass can be given fabrics on the friction calender, but the one-pass limitation on the embossing calender necessitates adjustment of the speed to give optimum durability of the impression. Allowance must be made in drying the goods for 2-3% shrinkage in the calender step.

Durable calender treatments of cotton fabrics should not be mentioned without giving credit to Joseph Bancroft & Sons Company for their excellent work in this field.

Many of you probably heard the paper by Lawrence and Phillips at the AATCC Convention last fall in Atlanta (*29*) on the use of resins to produce colored three-dimensional effects on cotton fabrics. Special inks are used for application to the embossing cylinder to obtain an inlay effect. It is also possible to add ink to the raised portion of the fabric.

V CHEMICAL MODIFICATION OF COTTON

In the last few years considerable attention has been given to the use of cotton as a base material for new fibers (*27*). The most extensive work along this line has been done at the Southern Regional Research Laboratory of the U S Department of Agriculture in New Orleans, La. The objective is to provide cotton with im-

proved performance characteristics and at the same time retain its fiber structure.

The most feasible chemical reactions of cotton seem to be esterification or etherification of the hydroxyl groups (*28*). Acetylation of cotton renders it extremely resistant to deterioration by microorganisms and improves its heat resistance. Cyanoethylation of cotton improves its properties in a similar way. Both of these modifications are now in the pilot-plant stage of development. Phosphorylation of cotton makes it resistant to both flame and mildew. Numerous other reactions are possible, and many of them have been or are being investigated on a laboratory scale.

It is not possible now to foresee how far these developments will go. Probably special plants will be built to produce these chemical modifications so that ordinary finishing plants will not be involved. In any event, the activity in this field is a good omen for the future of cotton.

ACKNOWLEDGMENT

The author wishes to express appreciation to his colleagues in Antara Chemicals and the Central Research Laboratory of General Aniline and Film Corporation. Special acknowledgement is due to Hector Borghetty of the Rohm & Haas Company for many valuable suggestions. William Sumner assisted in preparation of the figures.

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Minutes——

One Hundred and Ninety-seventh Meeting

COUNCIL

THE Council held its 197th meeting in the Hotel Statler, New York, N Y, on Friday morning, June 17, 1955. Present were President Raymond W Jacoby; George O Linberg and Walter M Scott, vice presidents; Albert E Sampson, treasurer; Leonard S Little, chairman of the Executive Committee on Research; William D Appel, J Robert Bonner, Carl Z Draves, C Norris Rabold, Thomas R Smith and P J Wood, past presidents; Ernest R Kaswell and Robert D Robinson representing Northern New England; Edward W Lawrence and Thorwald Larson representing Rhode Island; Rudolph C Geering representing Western New England; Bernard K Easton representing Niagara Frontier; Matthew J Babey, Charles W Dorn, Patrick J Kennedy and Paul J Luck representing New York; Carleton T Anderson, Thomas R Scanlan, Jr, Herman L Steen and Frederick V Traut representing Philadelphia; Lawrence L Heffner representing Washington; Raphael E Rupp representing Piedmont; William B Griffin representing Southeastern; James A Doyle of the Publicity Committee; William A Holst of the Committee on Constitution and Bylaws; Albert E Johnson of the Corporate Membership Committee; J Edward Lynn; and Harold C Chapin and Richard R Frey of the secretary's office.

The secretary's report of the 196th Council meeting and financial report of May 26, and the treasurer's report of June 6, were accepted. The three Bylaw amendments proposed at the April Council meeting were reported adopted by letter ballot.

In reference to conflicts with Section

(*Concluded on Page P560*)

SECRETARY'S FINANCIAL REPORT—May 26, 1955

	Applications	*Dues, regular & reinstate*	*Dues, Corporate & Sustaining*	*Miscellaneous*	*Totals*
Received & transmitted to Treasurer Aug 1, 1954 to March 31, 1955	3778.50	60588.50	45732.50	13617.10	123716.60
March 31, 1955 to May 26, 1955	636.00	853.50	2915.00	2512.00*	6916.50
Total in fiscal year to May 26, 1955	4414.50	61442.00	48647.50	16129.10	130633.10
Leaving deposited by Treasurer with Secretary					3303.21
For comparison, receipts to May 27, 1954	4029.50	45482.75	47142.50	26887.22	123541.97

* Miscellaneous items:

Reporter & reprints	49.54
Drycleaning Kit	.50
Year Books	359.90
Crockmeters	676.53
Crock Cloth commissions	175.95
Multifiber cloth commissions	355.94
Moth cloth commissions	58.75
Water test apparatus	8.00
Dyed standards	38.00
Knitted tubing	20.00
Gas-fading units, commissions	80.00
Buttons	9.75
Color transfer charts	97.05
Flammability blue print	1.00
Colour Index	99.00
Analytical Methods	5.00
Application of Vat Dyes	214.95
Cotton skeins, commissions	28.18
Standard grease wool	56.00
Gray scales	6.00
Repayment of 1955 Convention expenses	171.96
	2512.00

New York Section——

THE APPLICATION OF WRINKLE-RESISTANT FINISHES TO COTTON*

HECTOR C BORGHETTY

Rohm & Haas Company
Philadelphia

The practical aspects of crease-resistant finishes on cotton fabrics are discussed. The advent of new resins is considered to have made possible the use of chemo-mechanical finishing techniques. The amalgamation of chemistry and engineering has brought about embossed three-dimensional colored patterns of great beauty. Mention is made of the process of incorporating acrylic dispersions and pigments into synthetic-resin finishes to attain simultaneous "dyeing" and finishing. This development promises to establish a trend that will finally place the fabric-finishing industry on a more highly streamlined basis. Serviceable cotton fabrics could not be produced with the standard urea-formaldehyde resins available because of the low resistance of these resins to the chlorine used in household and commercial laundries. New resins now make possible fabrics that can be subjected to standard laundering conditions.

Specific recommendations are given on the amount and types of resins for optimum results on fabrics and emphasize the necessity of employing builders and softeners to obtain the necessary variations in hand normally expected from cotton fabrics. The necessity of the proper selection of catalyst is stressed, and the various requirements of good catalysis are discussed. The metal chloride catalysts, which have been so successful in Europe, are now becoming popular in the United States.

Curing conditions and their effect on the stabilization of the fabric, as well as on the physical properties, are also discussed. The laboratory control of plant operations is outlined, and the limits of crease recovery are defined.

INTRODUCTION

THE treatment of cotton fabrics with synthetic resins to impart crease-resistant properties has met with considerable acceptance because of the increased serviceability of the resultant garments. The stimulating effect of crease-resistant finishes has brought about many favorable changes in the processing of cotton fabrics, and it is now quite evident that these new finishes do not merely represent a style trend, but rather the opening of broader horizons to the producers of cotton garments.

The process invented in England 25 years ago by Tootal Broadhurst Lee Co, Ltd, found success only on rayon fabrics; it did not achieve success here on cotton because the synthetic resins available at that time would not withstand the severe laundering to which the resultant garments must be subjected. Attempts made 18 years ago to utilize the standard monomeric-resin pastes were unsuccessful because of the damage that occurred during the chlorination process as carried out in commercial launderies. No damage occurs on rayon garments because these do not come into contact with chlorine. The application of resin finishes to cotton thus remained dormant for a number of years, while, by a peculiar coincidence, three of four large finishing companies became the guardians of resin treatments and developed many technological improvements for use on cotton. One of these companies, Joseph Bancroft & Sons, over a period of years accumulated so much information that it was able to license completely developed processes to the industry. The cotton finisher hence had immediately available knowledge that made possible the rapid growth of chemical finishing techniques.

Cotton fabrics treated with resin finishes now represent a total yardage greater than the entire yardage of hydrophobic fabrics made from the new synthetic fibers; three years ago merely half one percent of the total cotton yardage was treated with crush-resistant finishes, while today it figures at close to 5%.

The finishing of cotton fabrics is an entirely different technology from that of rayon fabrics. The latter are made from relatively clean fibers that simply need to be scoured, dyed and finished. Cotton fabrics are subjected to vigorous treatments in rope form and are under tension most of the time during processing through the finishing plant. Intricate equipment and handling methods are then necessary to relax these materials adequately and to make them shrink-resistant.

RESIN APPLICATIONS

TYPES OF RESIN——One of the first considerations for cotton crushproofing is the selection of the resin. The new synthetic resins that have become available in recent years are the melamine and the reactant-type monomers, both of which are satisfactory for cotton use and superior to the older types known as urea-formaldehyde-resin pastes. The melamines and the reactant-type resins when introduced became acceptable mainly because of their superior resistance to chlorine damage. Melamines have the drawback of yellowing in chlorine baths. An improvement in this respect has been made recently by utilizing a magnesium chloride catalyst, which increases the resistance of melamines to chlorine. Unfortunately, this protection is not durable, and, furthermore, if the fabrics are tested by either of the two AATCC chlorination tests, it becomes apparent that the magnesium chloride does not protect the melamine from yellowing at temperatures above 100°F.

Reactant-type resins, on the other hand, do not yellow in chlorine, hot or cold, and thus permit greater flexibility of resin-finishing treatments. Both melamine and reactant resins are made from more expensive raw materials and, in addition, cannot be manufactured by the simple processes disclosed in the TBL patents.

The textile-finishing industry does not make a practice of manufacturing its own chemicals and generally utilizes the facilities of large chemical companies, dyestuff manufacturers, and specialty-chemical suppliers. In this manner each finisher has the advantage of selecting whatever chemical he desires. The recent tendency of endeavoring to manufacture chemicals on location in the textile mill places the finisher at a disadvantage because he is apt to use materials that may have become obsolete as a result of the fast-moving and progressive trend of the chemical industry.

The cotton finishing plant, furthermore, is faced with the problem of pumping large amounts of solutions between various de-

* Presented at the Statler Hotel in New York on Friday evening, January 28, 1955.

partments and buildings. This means the resins must be stable and homogenous. Solutions of monomeric urea-formaldehyde resin do not always fulfill these conditions. In certain mechanical finishing techniques, such as, for instance, embossed fabrics, there are lengthy time factors involved where unstable resins would be a source of great difficulty. Cotton finishing, furthermore, requires the employment of calenders, breakers and frames in a more complex manner than the finishing of synthetic fibers, and, in addition, cotton fabrics require many modifications in hand, weight and resiliency, which can be obtained by various combinations of builders and softeners.

AMOUNT OF RESIN———There is a maximum amount of resin that can be used on cotton, an amount that is about one-half the quantity used for rayon as shown in Table I.

Beyond the optimum amount of resin there is a marked decrease in the physical properties of the fiber, which results in lower abrasion and, particularly, lower tear strength. Hence, it is necessary to compromise between the degree of crush resistance and a certain sacrifice in the physical properties of the fiber. The cotton fiber is so strong initially that a loss of 15 or 20% in strength can be afforded, since even then it is far more resistant to wear than the majority of rayon fabrics on the market. Thus, an amount of resin to get optimum creaseproofing, for cotton can be justifiably selected with some small sacrifice in strength.

The loss in tear strength of cotton fabrics treated with resins can be controlled by the incorporation of softening agents, particularly of the cationic type, which have sufficient durability to withstand the plant afterwash. The recent work by Abrams and Sherwood (*1*) shows that the loss in physical properties of the fiber can be reacquired by the addition of rubber latices. This information will undoubtedly have far-reaching repercussions on the application of crushproofing resins to cotton. The authors describe in detail, with abundant data, the effect of reactant resins used in conjunction with many synthetic-rubber dispersions and show how the total resin solids can be doubled to give greatly improved angles of crease recovery and satisfactory physical properties of the resultant fabrics. The data offered points the way to a substantial and long-overdue revision of the theory of cotton resin treatment.

EQUIPMENT———Machinery plays a very important part in the success of the cotton crushproofing operation, and plants often find it necessary to modify equipment in order to adapt it to the necessity of slack-drying techniques. This problem has been solved very successfully in Europe by the use of the overfeed pin tenters, which are now becoming more popular in the United States. The pin tenter can actually be considered as a compromise system between slack drying and frame drying. Clip tenters customarily employed in our plants have the drawback of stretching the fabric excessively, thus giving a rather thin flat finish of poor dimensional stability to washing.

TABLE I

OPTIMUM RESIN CONTENT ON FIBER (AFTER WASHING)

Rayon	9-14% UF monomeric resin
Cotton	4- 6% reactant resin
	(melamine requires double these figures)

There are several methods of drying that represent intermediate conditions between slack and frame drying. An example consists in inserting a slack dryer ahead of the tenter frame in a manner to permit the fabric to dry partially in relaxed form; it then passes in tandem to a tenter frame for the elimination of any wrinkles while some of the dampness is still present. The cotton fiber is known to swell markedly on wetting and to return to its original dimension on drying. When dried in slack form, the threads remain in a relaxed condition with consequent improved crushproofing and stabilization. This is an important advantage over conventional frame drying, wherein the threads are distorted and thus good shrinkage control of the fabric is not attained. Predrying in the loop dryer, followed by the frame, gives a compromise effect that is quite satisfactory and makes possible practical operating conditions without the use of expensive pin tenters. A Sanforized (*2*) treatment between the drying and curing operation is also effective in giving improved fabrics.

RESIN FIXATION AND DISTRIBUTION ——— Equally important as the amount of resin applied is the actual fixation of that resin; care should therefore be taken in the padding of the resin solution.

An average formulation of synthetic resin for padding on cotton fabric is about as follows:

125 lb reactant resin (50%)
80 gal water at 110°F
12 lb catalyst (amine type)
or 20 lb magnesium chloride
8 lb durable cation-active softener
2 lb nonionic penetrant
16 lb builder (durable, cross-linking type, such as polyvinyl alcohol, which reacts with the resin).
to 100 gal

Pad, dry at low temperature, cure three minutes at 300°F, wash, and give compressive shrinkage treatment.

At an average padding retention of 66%, the amount of thermosetting reactant resin deposited in the fiber will be 5.0%. On curing, the resin solids will drop to 4.5% because of the resin—cellulose cross-linking reaction, with subsequent loss of water of reaction. On after washing there will be a further loss of unfixed resin to be considered (approximately 0.2%). This leaves a total resin deposit in the fiber of 4.3%, the amount fixed being readily determined by analysis. This amount should be considered as the actual durable-resin fixation. Only when the resin is well catalyzed and chemically reacted do the properties of crush resistance become durable to washing. The resin, furthermore, should be evenly distributed inside the fabric and not on the surface of the fiber. Good resin distribution is a function of the uniform and thorough preparation of the fiber as well as of the padding conditions. Cotton fabrics are difficult to prepare because of the yarn construction and of their natural impurities. As printing gums are oftentimes not readily removed, an extra preparation of printed fabrics prior to resin finishing is often necessary. The complete removal of the printing thickeners oftentimes results in a loss in color value of 15 or 20%. This is a very important cost item, and it is often better to utilize printing gums that are initially more expensive but maintain better color value after washing. Alginate and carboxymethyl cellulose are gums that answer such requirements. A variation in penetration of the resin solution into the printed areas of the cotton cloth may result in variations in crease resistance over the face of the fabric and a consequent irregular puckering. These problems have, and can be, solved satisfactorily, but they always occur in finishing plants that are just initiating resin treatments.

CURING———The choice of catalyst for curing is predetermined by the type of resin that has been selected, by the speed and the heat of curing, and by the type of machinery used. For machines geared to give a curing time of three minutes, a curing temperature at 300°F is required. At 360°F the speed becomes one minute because catalysis is a time-temperature reaction.

DRYING———Drying is best carried out as a separate operation prior to curing, and the temperature of drying is extremely important because fabrics dried quickly can give surface resin effects, particularly with those types of resins that form three-dimensional polymers. Surface-resin formation does not occur with resins of the reactant type because they function entirely by chemical reaction with the fiber and do not form polymer. Surface polymeric resin shows up as a faint film or scum that gives dusting when the fabric is torn. The better the fabric is prepared, the better will be the penetration of the resin solution, with consequent better crush resistance and superior physical properties.

GENERAL CONSIDERATIONS

CHLORINE RETENTION———Once a cotton garment has been sold to a consumer, little control can be exercised over the manner in which it will be washed and bleached. The custom of labeling the garment with the precaution, "Do not use chlorine", has not been found to guarantee that a housewife will not use chlorine to clear the "tattle-tale" gray that white garments always acquire after many uses and washings. White blouses and skirts often contain colored trimmings that should withstand the chlorination process recommended on the Clorox bottle. Resins used to finish these fabrics should be of the maximum possible chlorine resistance in order to avoid damage during the subsequent hot ironing process. Certain U-F resins show complete disintegration after one chlorination and should therefore not be used on washable garments. Claims could result that may set back the entire cotton-crushproofing program. The reactant resins, although more expensive, are of much better chlorine resistance and will not give excessive damage unless treated with greatly excessive amounts of chlorine.

SELECTION OF FABRICS———Normally speaking, slack constructions and open weaves give excellent crushproofing qualities in themselves and are more suitable for resin treatment. When a resin is used on an intrinsically good fabric, the results are greatly enhanced; whereas, on a difficult fabric such as a broadcloth, the improvement is not so great. Convertors who have full control over weaving, merchandising and finishing are in a position to select the right fabrics for resin treatment. A satisfactory crease-resistant fabric should have an angle of recovery of 105-115°.

SPECIAL MECHANICAL FEATURES ———These were the precursors of the crease-resistant finishes, and for many years durably glazed embossed fabrics were the only resin-treated cotton fabrics merchandised. Mechanical operations used in conjunction with resins to impart durability to washing have established a trend that promises to give greater versatility to cotton fabrics and enables them to compete for many new and novel markets. The cost of cotton is so low that it can stand substantial addition of chemical cost if an unusual effect results that permits the final fabric to compete with the high-priced, newer synthetic fibers. The cost of chemical finishing techniques will be reduced as the demands for special finishes climb and the streamlining of process operations is made possible.

The cotton-finishing industry is finally, and successfully, heading towards greater streamlining and to the development of better fabrics. Streamlining will eventually make possible "dyeing" and finishing in one operation. This is not too difficult a goal to attain, as proven by the recent successful simultaneous "dyeing" and finishing processes made possible by the introduction of thermoplastic dispersions as resin binders. These thermoplastic resins not only act as binders but are also able to function in conjunction with the thermosetting resins used as finishes to give coloring and finishing in one continuous operation.

At present many of the soluble dyestuffs are not satisfactory when used in conjunction with thermosetting resins. This is one of the reasons for the trend toward coloring with pigments. The thermoplastic resins, which act as pigment binders, are completely transparent and are able to anchor the pigment mechanically to the cloth, while allowing the thermosetting resin to react independently and to give the desired stabilization, crushproofing, or other chemomechanical effect.

REFERENCES

(1) "Modification of Urea-Formaldehyde and Melamine - Formaldehyde Crease - Resistant Finishes with Polymeric Latices", E Abrams and N Sherwood, *Am Dyestuff Reptr* 43, P780 (1954).

(2) Trade-mark registered by Cluett, Peabody & Co, Inc.

DISCUSSION

Question: I noticed that you glossed over the question of "after-washing". I understand that is quite an important factor in resin processing.

Answer: If unscoured resins are allowed to remain in the cloth, they will continue to be catalyzed and may evolve methyl amines that given unpleasant odors under certain conditions during the summertime, particularly in damp climates. This occurs especially when the curing and the drying operations have not taken place under the right conditions. The atmosphere about the fabric in curing must be well exhausted to avoid the accumulation of formaldehyde fumes, which can react and cause the formation of undesirable amines. However, it is best to after-wash. This is the standard recommendation, but it is not always standard practice. Many plants do not after-wash because they have learned to control the many factors involved, such as the type of catalyst employed and the exclusion of ammonium salts and trace minerals. Proper ventilation or a passage of the fabric through fumes that neutralize the acid cloth is helpful. After-washing on the alkaline side is the only sure method of avoiding unpleasant odors.

Q: Technicians working on the anticrease invention spent 14 years developing the process. Actually, their work was done mainly on cotton, but when the invention came to the United States it was first applied to rayon, and we went a little ahead of England on that originally. I don't say we're ahead today because they do get beautiful results on cotton and good anticrease on rayons.

A: That is an interesting point and explains what occurred for a good reason. In Europe there is no large-scale laundry industry, whereas, here, it is a part of the American way of life. Chlorine is not used solely as a bleaching agent, it is used also as a disinfectant, and is very effective in the control of the spread of disease. This is a particularly important factor in the apartment houses of our large cities where there is a constant mingling of laundry in the cleansing units. The Europeans do not face the problem of chlorine damage that we face in the United States, where chlorine damage has become a factor complaint against the use of resins on cotton. As far as rayon is concerned, washability was never the most important factor because the fabrics are usually drycleaned.

Q: Recently there have been introduced mixtures of cotton with other fibers, such as Dacron and nylon. What is the crush resistance of the resultant fabrics?

A: The Dacron component is blended with cotton to give it crush resistance and dimensional stability, but the amount of Dacron required is so great that the cost of the final fabric becomes too high. We must thus compromise between using a cotton fabric with a resin treatment or a cotton fabric that contains Dacron fiber. The amount of the latter fiber will determine whether we need to apply a crush-resistant resin. When 20% nylon is added to cotton it acts as a lubricant and causes slippage of the fibers. Cotton yields strong fabrics because it has a spiral-like twist that allows the fibers to link during spinning. Nylon causes a lowering of spiralling linkafe and of the fabric properties. In other words, the trend that is taking place of blending fiber with cotton has not yet been well defined.

Q: How permanent are these resin finishes in terms of actual laundering?

A: Cottons treated with reactant types of resin are extremely durable and will withstand the Sanforized (2) wash test that is very severe and corresponds to many home launderings. Urea-formaldehyde resins are not so durable. The builders added to the finishes should be polyvinyl alcohol, hydroxyethyl cellulose or starch ethers that are able to combine with the resin to give durability of 'hand'.

Q: I am wondering whether bleaching with sodium chlorite would also give deleterious effects on fabrics treated with reactant-type resins.

A: No, there is no difficulty because the chlorite does not evolve chlorine as in the case of hypochlorite.

Q: Is mercerizing helpful?

A: Yes, particularly if carried out with a minimum of tension to allow the fibers to swell and to become more receptive chemically and physically to resin treatment.

Q: How about mercerizing after resin treatment as practiced in England?

A: That is not so important as prior mercerization. Relaxation or compressive shrinkage after resin treatment is more helpful than mercerizing.

Q: Are pleated effects possible?

A: Yes, pleating in either warp or filling direction can be accomplished by mechanical devices prior to drying the fabric; drying and curing should follow to set the resin in the pleated position.

Q: Is ammonium chloride a satisfactory catalyst?

A: On cotton its action is more drastic than on rayon. The amine catalysts or metallic chlorides are better.

Q: Are there means other than washing to remove odors?

A: Fumes of ammonia have been used successfully but require specially constructed chambers.

Council Report——

(*Concluded from Page P556*)

outings it was noted that the date of the current meeting was set by the Council in June, 1953 and published in the AATCC Calendar from August 31, 1953. The dates of future Council meetings were approved as follows: September 21 in Atlantic City; November 18, 1955 and January 20, 1956 in the Hotel Statler, New York; April 20 and June 15, 1956; September, 1956, in connection with Perkin Centennial; November 16, 1956 and January 18, 1957.

It was announced that Miles A Dahlen would receive this year's Olney Medal Award. The personnel of the Committee of Award for next year will remain the same, ie, H Y Jennings, chairman, W M Scott, P Theel, P L Meunier and President Jacoby (ex officio). Suggestions for the award of 1956 will be welcomed by the secretary of the Association or by the voting members of the Committee.

The budget for year beginning August first was presented by Mr Sampson of the Committee on Appropriations, and was adopted with amendment. This did not include a contemplated insurance and a pension plan now under consideration.

Mr Linberg reported on the Ladies Night programs held in Sections of the New England Region, and Dr Scott, on a unique program of the Washington Section devoted to descriptions of the functions of various government departments by Section members employed in them.

Reporting for an interim committee appointed at the April meeting, Mr Babey recommended the formation of a "Subject and Speaker's Bureau," which the President would be authorized to appoint. A report from Mr Herrmann, chairman of the committee considering inter-society relations, was presented by Mr Bonnar. The purposes proposed were approved, but the report was referred back to the committee for consideration of suggested modifications in method of attainment.

Mr Little reported for the Executive Committee on Research. Thanks were voted Mr Dorn, Mr Fynn and Dr Stiegler for their work on exposure of fabrics in the most recent atomic bomb tests. Mr Dorn's appointment as advisor to the New York State Commission on Flammability of Textiles in respect to the test methods of the Association was approved.

Mr Johnson reported progress in the Corporate Membership campaign, requesting and receiving approval of effort to bring all corporate contributions into conformity with new schedules for the year 1956. Mr Doyle reported on publicity.

For the Publications and Colour Index Editing Committees, Mr Holst reported that the dye list would be completely revised for the 1956 Year Book, the first in which new *Colour Index* numbers would appear. He further reported that substantial quantities of *Colour Index* proofs had been corrected and returned, but publication would probably be delayed until the summer of 1956.

Mr Linberg reported progress in plans for the Atlantic City convention of September 21 to 24, the Perkin Centennial celebration of September 1956 in New York, the convention of 1957 in Boston and that of 1958 in Chicago. An invitation from the Southern Region to hold the 1959 Convention in Washington was accepted with thanks. Because of the travel involved, an invitation from the Pacific Southwest Section to hold the 1960 Convention in Los Angeles was declined with regret.

The meeting paused in memory of Walter F Fancourt, 3rd. Mr Traut, appointed to complete Mr Fancourt's unexpired term on the Conventions Committee, outlined plans for the forthcoming Atlantic City Convention. As chairman of the Philadelphia Section, Mr Traut announced two more courses to be given under supervision of the Section's Educational Committee at the Philadelphia Textile Institute this fall, on "The Finishing of Textiles" and "Thermodynamics and its Application to the Theory of Dyeing."

Presented by Dr Scott for the Committee on Membership and Local Sections, each of the following was elected to the class of membership specified:

CORPORATE

Bellman Brook Bleachery Co
Botany Mills, Inc
Cook P & N Machine Co, Inc
Courtaulds (Alabama), Inc
Haartz Auto Fabric Co
Institute of Industrial Launderers
International Salt Co, Inc
The Jefferson Mills, Inc
Metro Atlantic, Inc
Morningstar-Nicol, Inc
Pellon Corp
Pepperell Manufacturing Co
Wyandotte Chemicals Corp

SENIOR

W N Armstrong, C P Bolde, D Butterworth, Jr, C J Callaway, Jr, R F Cernik, H H Croland, T Fenn, G D Galloway, E A Glaus, R J Godunsky, W D Graham, J L Harlow, W E R Jacobs, S Leong, D Martin, H A McCleery, J E McLaughlin, J L A Morin, F J Price, C A Robinson, E M Roth, Jr, R E Roy, B Schwalbe, M C Shaw, H I Spence, A C Stevenson, W L Szabo, A J Tokarz, E G Wiest, G A Young.

JUNIOR

W H Cheek, F N Handal, L R Maguire, W A Moran, R P Ortlip, J F Vallone.

ASSOCIATE

W A Elliott, G R Hodgins, C L McDaniel, J E Sanders, Jr, P E Wikle, J G Wylie.

STUDENT

A M Minatelli, Jr, R Murase, B Park, E C Penski, E R Tucci, D R Vermette, F W Wilson.

APPLICATIONS FOR TRANSFER FROM OTHER CLASSIFICATIONS TO SENIOR

L W Cleveland, Jr, E J Elliott, L B Ricard, R C Sharpe.

Respectfully submitted,
H C CHAPIN, *Secretary*

Midwest Section——

NOTES ON PACKAGE DYEING*

ERNEST CASWELL

Ciba Company, Inc

The author offers comments and advice on package-dyeing yarns of various fibers. In the case of cotton he has found that a boil out with acetic acid is effective, and he emphasizes the usefulness of a semibleach with perborate and dyeing with peroxide-stable directs. Pigment filter tests for vat dyes and the releveling of vats on packages are discussed. The importance of winding packages and of the maintenance of adequate flow are emphasized. He explains the preparation and dyeing, of elastic nylon yarn and cites experiments showing maintenance of stretch. He also gives suggestions for improving the fastness and levelness of nylon-yarn dyeings in general.

INTRODUCTION

IN accepting an invitation to talk about package dyeing, it seemed necessary to review the new developments over the past year. The results of the survey showed that the resultant pages would then be very short indeed, and that the only alternative was to review some of the major developments of the past few years and to intersperse them with the new. The following paragraphs, unlike a jig-saw puzzle, will not fit together to produce any particular phase of package dyeing. However, I hope you will find something of interest and a verification of the fact that other dyers also have their problems.

YARN PREPARATION ——— It is most logical to start with the preparation of the yarn. We have found that the use of acetic acid in boiling out cotton yarn is gradually gaining favor in many package dyeing plants. Originally, this process was used only for beam dyeing. Here it was found not only to give good penetration, but there was also only a slight increase in pressure during the dyeing. This meant that there was less swelling and matting of the yarn on the beam and therefore less resistance to the flow of liquor, the result of which was fewer "blown beams." The use of acetic acid soon spread to cheese dyeing and then to package work. It is used in the preparation of yarn for dyeing with all types of dyes, especially vats and naphthols.

The simple procedure is as follows:

Boil-out at 200°F for 30 minutes with
2% acetic acid (56%) owf.
Drain.
Rinse free of acid.
Refill and dye as usual.

SEQUESTERING AGENTS ——— Another item that I would like to call to your attention is the use of sequestering agents in the dyebath. The use of each type should be given careful consideration. Some do a very good job at low temperatures, but the inorganic types tend to break down when they are subjected to a prolonged boil. It also will be found that some of these sequestering agents affect certain direct dyes. There appears to be a reaction between the metal complex of the dye and the sequestering agent, which results in an entirely different shade. It also is true that varying the amount may affect the shades.

Here are several sample cones of helio and tan. The cones marked #1 were dyed without a sequestering agent. The others were dyed with various amounts and types. I wish to call your attention to set #2. Equal amounts were used in this set. Here the tan shows a definite break, while the helio is barely affected. Set #3 contained an increased amount of the same sequestering agent that was used in set #2. Here the tan shows little change, while there is a distinct change in the helio.

Please do not misunderstand me, I believe that sequestering agents are very useful, but they must be selected in order to obtain the best results.

SEMIBLEACH IN PREPARATION ———There are occasions when a semibleach is required before dyeing direct pastel shades. If the dyer usually boils out the yarn, then, of course, the semibleach can be incorporated in the boil out. If his procedure is only to wet-out the yarn at, let us say, 100-120°F or to start with dry yarn, then he can combine the semibleach with the dyeing process. This process will not remove completely all the motes and fly but will give a cleaner and brighter base upon which to build the shade. The following can be adjusted to meet the dyer's routine:

Circulate at 100°F for 15 minutes
½-1% penetrant
½% Quadrafos.
Add and circulate for 5 minutes
1% Albatex POK
2-4% perborate of soda.
Dissolve and add the direct dyestuff.
Gradually raise the temperature of the bath liquor to 200°F over a 30-minute period.
Continue dyeing as a direct color.

The longer period required to raise the temperature allows a gradual release of the oxygen and a better bleaching action. In this process, it is necessary to select dyes that will withstand a mild bleaching action, among which are the following:

Chrysophenine
Direct Fast Orange WS
Direct Brilliant Sky Blue 6B
Chlorantine Fast Red 7BLN
Chlorantine Fast Grey GRL

As there is some loss of color value in the initial dyeing, this must be taken into consideration in making additions. The oxygen is usually spent by the time the first sample has been checked, and therefore additions at this point will yield full color value and should not be based upon a percentage of the original formula. Incidently, this process generally leaves the yarn with a softer hand than some bleaches.

Here are packages dyed by the above method:

Maize
0.015% Chrysophenine Conc
Pink
0.075% Chlorantine Fast Red 7BLN

MIGRATION OF COLOR ——— I would say that most of us have had trouble at one time or another with the migration of direct dyes in extracting and drying dyed packages. This occurs in both tray and port, or blower-type, dryers. We usually resort to the addition

* Presented at the Winter Meeting of the Midwest Section in the Bismarck Hotel in Chicago on Saturday, Feb 12, 1955. Some of the material of this paper was also presented at the Dyeing Symposium of the Philadelphia Section on Oct 30, 1954.

of 2-5 percent of common salt owf in the last rinse. It has been found that 1-3 percent of Epsom salt (magnesium sulfate hydrate) sometimes is more effective than common salt. I would say that 3 percent should be the maximum as more than this amount shows very little, if any, additional improvement. Another method is the use of cation-active resins, such as Lyofix EW. This not only eliminates migration in most cases but will also improve the water fastness. The anion of the direct dye combines with the cation of the resin to form a large molecule, which is less soluble in water. It must be emphasized here that the dyebath should be clear and free of soaps before adding the resin. This is not a panacea for all your migration troubles because the degree of improvement depends upon the individual dyestuff.

PIGMENT FILTER TESTS OF VAT DYES———In recent years some laboratories have found it necessary to carry the pigment filter test of vat dyes another step. This has been necessary in comparing competitive products. Here are two green pigment filters representing the same-type dyestuff. Both of these filters could be classified as being satisfactory for pigment dyeing. You will notice that there is a distinct difference in the residue, one being very grey and the other green. The only conclusive test would be to dye the filtrates. Here are the dyed skeins, and you will notice that there is little difference between the two. These blue and olive filters also emphasize that it is necessary to dye the filtrates for a correct evaluation.

The following is a complete procedure:

Take 1 gram double paste or its equivalent.
Disperse for 30 minutes in 100 ml of water at the pigmenting temperature.
Filter through a 15-cm Whatman #5 filter paper.
Make skein dyeings with 80 ml of the filtrate.
Compare the results.

There is always a need for a Royal Blue in the ingrain knitgoods line. This shade, which cannot be obtained with developed colors, requires no bleach fastness. Heretofore, it has been necessary to resort to anthraquinone-type dyes for this shade. Sulfur and indigoid dyes have been difficult to dye sufficiently level for this work. A method for dyeing this blue with indigoid dyes, shaded with a small amount of an anthraquinone type, has been developed in the Ciba Laboratories. It overcomes difficulties, such as shading from red to green in the package, excess crocking and washing down. This combination has replaced the more expensive anthraquinones in many plants. Here is a cone wound from a batch dyed as follows:

Boil-out at 200°F for 30 minutes with
2% acetic acid (56%).
Drain and rinse.
Refill at 140°F.
Circulate 5 minutes
½% Calgon
1% Albatex POK.
While the yarn is boiling-out, disperse for 30 minutes at 140°F
8.00% Ciba Blue 2B Micro Powder
0.50% Cibanone Violet 4R Double Paste.
Add the dispersed dyestuff over a 15-minute period.
Dissolve and add over a 15-minute period
6.00% caustic soda flakes.
Add over a 10-minute period
6% hydrosulfite.
Circulate 20-30 minutes.
Dilute and add, over a 15-minute period
8% acetic acid (56%).
Circulate 10-15 minutes.
Drain.
Cold running wash, "inside-out", until clear and free of alkali.
Close off drain valve.
Add
1-2% sodium perborate.
Raise temperature of bath to 120°F and circulate for 10 minutes.
Add
½-1% detergent.
Raise temperature to 180-200°F and circulate for 15 minutes.
Rinse and finish as usual.

There are two points in this process that should be checked:

1) The Albatex POK is required to eliminate excessive crocking.

2) The acetic acid should be added slowly to the expansion tank.

Many of us are having difficulty with the popular charcoal shades. The best colors that I have found for level dyeing are the following:

Cibanone Navy Blue RA Double Paste
Cibanone Red FBB Double Paste
Cibanone Olive 2R Double Paste
Cibanone Brown GR Double Paste

This batch of mercerized yarn was dyed with the following:

1.90% Cibanone Navy Blue RA Double Paste
0.50% Cibanone Olive 2R Double Paste
0.53% Cibanone Brown GR Double Paste

REDYES———That word haunts us all the time. It is not so much of a problem with most direct and developed shades. There is always the hydro strip, which works very well. By the way, we used to call it the "Grady Wash." It didn't sound so bad over the loud-speaker system, and kept many a salesman guessing as to what the process was. Most laboratory work has been conducted with skeins and piece goods. The experiments that have been conducted on packages are more in line with retarding or leveling in the initial dyeing. Very little has been worked out on leveling packages that are already uneven. We have approached this problem by making packages of various depths of shades and natural yarn. Tests were made on this type of package and then evaluated. These packages, I believe, will give you another angle of approach to this problem.

Cone #1 is composed of rings as follows:

8% Cibanone Blue GF Double Paste
Natural Yarn
3% Cibanone Blue GF Double Paste
Natural Yarn
1% Cibanone Blue GF Double Paste

Packages of the above combination were treated as shown in Table A (at bottom of page). The packages were finished off with a running wash, oxidation and soaping.

The results were as follows:

Cone #2 showed definite rings denoting leveling was not obtained.

Cone #3 showed a ring although not so definite as #2.

Cone #4 showed that good leveling had been obtained.

Cone #5 still showed a slight ring.

Cone #6 showed a very slight ring, although the yarn was harsher and the shade duller.

Cone #7 was very dull and the color partially destroyed.

From the above tests it appeared that Cone #4 was the best.

We then made a package as follows:

Cone #8
Rings of
1% Cibanone Blue GF Double Paste
Natural Yarn

Cone #9 (Similar to #8)
This cone was treated the same as #4 and the results showed a very slight variation.

Cone #10 (Similar to #9)
This cone was built up to shade with an addition of dyestuff and showed very level results.

TABLE A

	2	3	4	5	6	7
Caustic soda, % owf	8	8	8	8	8	8
Hydrosulfite, % owf	8	8	8	8	8	8
Albatex POK, % owf	—	1	1	2	—	—
Sodium nitrite, % owf	—	—	—	—	2	2
Temperature, °F	140	140	140	140	180	250
Time, minutes	45	45	45	45	30	15
Repeat	—	—	Repeat	—	—	—

Experiments with Cibanone Violet 4R showed that the best method of leveling for that dyestuff would be the use of a high temperature. As you can see, we obtain levelness but with a distinct change in the shade. The cones of a direct brown showed the original package and the best results obtained in leveling.

Cone #1—Original of several shades of brown with natural yarn.

Cone #2—(Same as #1) treated as follows:
Circulate at 200°F for 30 minutes with 2% Albatex POK.
Drain.
Repeat.
Rinse.

Cone #3—Circulate water at 210°F for 30 minutes.

Cone #2 still showed definite rings, while Cone #3 showed very level results. It appears that if high-temperature equipment is available, it may often save stripping with hydrosulfite.

WINDING PACKAGES———Here I would like to digress from dyeing for a few minutes and discuss winding before delving into the problems of dyeing synthetics. Synthetic yarns require special handling, and the use of some method for measuring the density of dye packages is important. I will try to express density by weight and size of package by means of the different types of densometers, including the homemade ones. Tolerances should be set up through plant trials and then strictly adhered to. You may think I am overstressing this point on winding, but every precaution is needed to obtian good work in dyeing synthetic yarn, regardless of type. It will be of no use to set up standards and then to be persuaded to try batches that do not meet these standards. You may have luck with one or two, or maybe three batches. Then all of a sudden, *Bang!* the bottom falls out. Who gets the blame? The dyer, of course. All packages that do not come within these tolerances should be rewound, that is to say, rewound to a cone and then back to a dye tube, not from dye tube to dye tube. This is necessary in order to obtain the same tension as was had originally. This is true especially with filament yarn. It is possible to use high-speed winders for some yarns, although in some cases it is necessary to slow down the speed. The Universal #50 or Foster #75 give very good results. This is especially true when one has a conscientious fixer to keep the spindles correctly adjusted. A knitted sock or a plastavon cover should be used to prevent filament yarn from becoming frayed or damaged during the process.

Spun rayon requires special handling. Most mills are using the conventional winders. Fine counts, such as 50/1, require a radial-ball-bearing pressure roll on the precision winders to produce packages that dye satisfactorily. A well-dyeing package of 20/2 spun rayon would be as follows:

1⅝-inch tube with a knit sock
6-inch traverse on a #50 or #75 winder
4½-inch diameter
450 grams net weight

The same specifications as those above hold also for 50/1 spun rayon, except that the package should have a net weight of 340 g.

DYEING SPUN RAYON ——— Most dyeing difficulties usually occur when the spun rayon is boiled out and then cooled, by rinsing, to the dyeing temperature of 100-120°F. This cooling process packs the yarn and tightens the package to such a degree that circulation at this temperature is about nil. There are two methods in general practice:

Method #1 For Initially Dry Yarn
The dyebath is prepared with
Wetting agent
Sequestering agent
Albatex POK
Dissolved dyestuff.
The dry yarn is added, circulation is started cold, and the temperature is raised to 100°F.
Circulate for 15 minutes.
Gradually heat dye liquor to the dyeing temperature.
Circulate for 15 minutes.
Add salt in several portions.
Circulate for 15 minutes.
Sample.
Rinse and finish.

Method #2 For Hot Boiled-out Yarn
The yarn is boiled-out for 15 minutes at 200°F with
Wetting agent and
Sequestering agent.
Add and circulate 5 minutes
½-2% Albatex POK
Dissolve and add the dyestuff over a 20-minute period.
Circulate 15-20 minutes.
Add salt and continue as in Method #1.

The first method is usually applied in dyeing vats and naphthols. With vats, the dispersed dyestuff is added to the dyebath before the dry yarn, and the caustic and hydrosulfite are added simultaneously. Many prefer the second method for most dyeings, including pastel direct shades. It is necessary to select dyes that exhaust slowly and have good leveling properties; salt should be used very sparingly. While I stated that boiling out, followed by cooling prior to dyeing, slows down the liquor flow, this does not appear to prevent complete diazotization and development when required. A longer time cycle for these cold baths will assure full coupling. One other thought is to use inside-out flow as much as possible. Here we have a vat green dyed by Method #1. This direct eggshell and sulfur black were dyed by Method #2.

DYEING ELASTIC NYLON YARN ———The dyeing of elastic nylon yarn is another problem that is producing the usual number of headaches. Until recently this had been mainly a hosiery dyeing problem. This yarn is made by twisting nylon 75 to 80 turns per inch. The twist is set at 280°F for 30 minutes. The Yarn is then allowed to condition, and after that the twist is removed. One end of yarn that has had an S twist is plied with one that has had a Z twist. This plying usually contains about three turns per inch.

At present there appear to be four possible avenues to approach this problem:

1) Dyeing before twisting, etc.

2) Dyeing on packages and then steaming.

3) Knitting, dyeing in tube form, and unravelling.

4) Dyeing in the muff form on spindles.

NUMBER 1 This procedure is not feasible for at least two reasons:

(a) Most dyehouses do not have the necessary equipment.

(b) Twisting, etc after dyeing would greatly delay delivery to the knitting mills.

NUMBER 2 The main problem with dyeing this yarn on packages is trying to retain the crimp throughout the package. So far this has not been possible. The loss can vary up to 90 percent, and even in skein dyeing the loss may run up to 7 or 8 percent. Here some have stopped and have given up the idea of package-dyeing this yarn. Further developments have shown that most of this loss can be regained by steaming the yarn in relaxed form. Experiments along this line are being conducted to devise a method by which this steaming can be accomplished either during coning or in the finished fabric. Table I shows the loss and regain

TABLE I

LOSS OF STRENGTH OF ELASTIC NYLON YARN IN DYEING AND STEAMING

	Percent Loss
Natural yarn	0.00
Skein-dyed	7.25
Above steamed 1 minute	4.25
Package-dyed, reeled into skeins, removed, air-dried	26.00
Above, steamed 1 minute	8.00
Package-dyed, extracted and dried at 120°F	35.50
Skein from above steamed 1 minute	7.25
Skein from above steamed 5 minutes	6.00
Skein from above steeped in water at 140°F for 20 minutes	19.25

of stretch of a chromedyeing under normal conditions. These figures were based on yarn that had been elongated to 36 inches and the retraction measured.

NUMBER 3 This method is being used in many hosiery mills at the present time. It may appear cumbersome and expensive, although the mills claim that it is as economical as having the yarn commissioned-dyed. The yarn is knitted into a long tube on a large-size ribber and then looped into hanks. It is then dyed in the regular hosiery dyeing machine, and, after drying, the yarn is unraveled from the knitted tube directly to spools or cones. There is some question as to the smoothness of the final sock as compared with one which is knitted from yarn processed by Method #4.

NUMBER 4 This method could have been the outgrowth from experimental work on packages. It was found that stretched yarn could be wound on a 2- or 2½-inch core by use of a Kidde or Foster winding attachment. This core was removed and a ⅛-inch dye tube was inserted. The results after dyeing showed that the yarn near the core had retained approximately the entire amount of retraction. The yarn in the center showed about a 50% gain over an ordinary dyed package, although the outside showed no appreciable improvement. This method also could have resulted from skein experiments. However, the final result is a combination of package and skein.

The yarn is wound on a skein winder, and the usual tie bands are inserted. A knitted sock is inserted in each skein as it is being doffed. This is followed by the insertion of an English-type spring. The muffs are usually of 4-, 6-, or 8-ounce weights. The bulkiness of this material limits dye production to about one-third the rated capacity of the machine. The diameter of the 8-ounce muff prevents the use of all the spindles on the carrier.

A typical formula is as follows:

Scour at 160°F for 30 minutes with
3% long-chain alcohol sulfate
2% acetic acid (56%).
Rinse clean.
Refill at 80°F.
Circulate with addition of
0.20% Neovadine AN.
Adjust pH to 9.0 with
ammonia.
Dissolve dyestuff and add in 4 portions.
Raise bath temperature to 200°F over a 30-minute period.
Exhaust slowly with
ammonium acetate, or
ammonium sulfate, or
acetic acid.
Running wash until clear.
Soften at 100-120°F with
2% Sapamine OC.
After 10 minutes add
0.25-0.50% calcium chloride.
Circulate 10 minutes.
Drain.
Extract and dry.

To improve the wash fastness the following procedure is used:

After dyeing and rinsing refill cold.
Add
3-4% tannic acid.
Raise temperature to 160°F.
Circulate 20 minutes.
Drain.
Refill cold.
Add
1.5-2.0% tartar emetic.
Circulate 20 minutes.
Drain.
Rinse.
Scour at 140-160°F.
Rinse and finish as above.

Extraction should be carried out at room temperature and drying at or below 120°F. After drying, the yarn is allowed to condition for 24 hours before winding. It is beneficial to steam the yarn if possible, although not absolutely essential.

The scour before dyeing appears to aid in minimizing the barré effect. Calcium chloride will improve the absorbency of moisture in the final product, although it is not of a permanent nature. The following dyes meet the general requirements for hosiery:

Yellow	Benzyl Yellow 5G Conc
Red	Benzyl Red G Benzyl Red ROC Triazol Fast Scarlet 3B
Wine	Benzyl Bordeaux BV
Blue	Alizarine Fast Light Blue C
Navy	Alizarine Fast Blue R
Green	Alizarine Fast Green CGN Ext Conc
Grey	Alizarine Fast Grey RLL (unchromed)
Black	Yellow, Red, Blue, as above

Incidently, this nylon, after knitting, is set at 220°F for 1½ minutes. This setting temperature is much lower than usual, and it is essential to use dry steam for setting.

In the dyeing of spun nylon in general, the use of Cibalan Salt N or H is very effective for leveling all types of dyes. The Cibalan Salt H is preferred for pastel shades dyed with Cibalan dyes. Many dyers have had difficulty in controlling the shade of bright naphthol reds. They are now using the acid red and are after-treating it with tannic acid and tartar emetic. There is then only a slight staining in AATCC Wash Test #III.

DYEING OF DACRON BLENDS—— Although many of us consider that the dyeing of Dacron blends is still in its infancy, a good amount has been processed on packages. Dacron-wool blends are dyed at normal temperature, and Dacron-cotton, at both normal temperature and at the 250°F range.

A typical Dacron-wool procedure is as follows:

Scour at 140°F for 15 minutes with
0.25% Solvadine G.
Drain.
Rinse.
Refill at 120°F.
Add and circulate 10 minutes
diammonium phosphate (dissolved).
Add and circulate 10 minutes
Dowicide A (dissolved).
Dissolve and add in 4 portions
Dyestuff { Disperse Cibacetes with Albatex POK
Dissolve wool color separately
Raise to 200°F over 30 minutes.
Circulate at 200°F for 1½ hours.
Drain.
Rinse.
Soap at 140°F for 15 minutes with
0.50% Solvadine G
0.25% Tetrasodiumpyrophosphate.
Drain.
Rinse.
Extract.

Here we have samples of brown, navy and black with the formulas attached.

In dyeing the Dacron-cotton blends, one uses the Cibacete type dyes on the Dacron and, usually, vats on the cotton.

The Dacron may be dyed at normal temperatures with the necessary assistants, or at high temperature if such equipment is available. The material is then usually overdyed with vats to obtain maximum fastness. This black was dyed as follows:

Scour at 140°F for 15 minutes
0.25% Solvadine G.
Drain.
Rinse.
Refill at 120°F.
Add in 4 portions at 5-minute intervals
3.30% Cibacete Diazo Black B Ex Conc.
Raise to 200°F over 30-minute period.
Raise to 250°F over 15-minute period.
Circulate at 250°F for 1 hour.
Cool to 200°F.
Drain.
Rinse.
Refill at 160°F.
Add in 1 portion:
3.30% Beta-oxynaphthoic acid (dispersed)
Raise to 200°F over 15 minutes.
Add in 2 portions
10.0% tartaric acid (dissolved).
Circulate 1½ hours at 200°F.
Drain.
Rinse cold.
Add and circulate 5 minutes
6.0% sodium nitrite.

Add
6.0% sulfuric acid.
Raise to 200°F over 20 minutes.
Circulate 30 minutes at 200°F.
Drain.
Rinse at 160°F.
Drain.
Refill at 100°F.
Add and circulate 5 minutes
0.50% Calgon.
Add in 4 portions
10.0% Cibanone Black DRB Paste (dispersed).
Add in 4 portions
10.0% caustic (dissolved).
Add in 2 portions
10.0% hydrosulfite.
Raise to 140°F over 15 minutes.
Circulate 30 minutes.
Running wash until clear.
Oxidize at 120° F for 10 minutes
2.0% perborate.
Add
1.0% detergent.
Raise to 200°F.
Circulate 15 minutes.
Drain.
Rinse.

This procedure is very long. Some have tried to cut the time by making a two-step dyeing of the acetate black, that is, adding the bond with the dyestuff. This is possible although the results usually show considerably more crocking.

Speakers Announced for Special Course in Finishing

THE Educational Committee of the Philadelphia Section has announced the following list of speakers for the course "The Finishing of Textiles," which will be presented at the Philadelphia Textile Institute this fall:

September 26th—"General Survey of Mechanical Finishing." Harry F Creegan, sales mgr, Textile Division, James Hunter Machine Co, North Adams, Mass.

October 3rd—"General Survey of Chemical Finishing." Albert C Nuessle, Textile Applications Laboratory, Rohm & Haas Co, Philadelphia, Pa.

October 10th—"Wool Finishing." Werner von Bergen, director of research, Forstmann Woolen Co, Passaic, N J.

October 17th—"Wool Finishing." Herbert C Haller, Materials Engineering Dept, S Stroock & Co, Inc, Newburgh, N Y.

October 24th—"Cotton Finishing." Louis B Cook, director of research, Millville Mfg Co, Millville, N J.

November 7th—"Cotton Finishing." Hector C Borghetty, Textile Chemicals Dept, Rohm & Haas Co, Philadelphia, Pa.

November 14th—"Rayon & Acetate Finishing." Jackson A Woodruff, Textile Research Dept, American Viscose Corp, Marcus Hook, Pa.

November 21st—"Nylon Finishing." Burt F Faris, Textile Fibers Dept, E I du Pont de Nemours & Co, Inc, Wilmington, Del.

November 28th—"Finishing of Other Synthetics." Harry Moore, plant superintendent, Fair Lawn Finishing Co, Fair Lawn, N J.

The complete course will cost $20.00 per person, which will include the cost of a textbook. It will be given from 7:30 to 9:30 PM.

Information and reservations may be obtained by writing to the Educational Committee, Philadelphia Section, AATCC, P O Box 5025, Philadelphia 11, Pa.

AATCC Monograph No. 2
"THE APPLICATION OF VAT DYES"

"The group of fifteen editors responsible for this monograph consists of a well-balanced cross-section of American industry concerned with the production, marketing and application of vat dyes. The AATCC is to be congratulated on the production of a comprehensive survey of American vat dyeing and printing practice which is the major theme of this application . . . the book will be useful as a work of reference at this side of the Atlantic and as a working manual for the American colorists for whom it was designed. . . . If a clear account of American practice is required . . . the enquirer *must* have access to this volume."—*JOURNAL OF THE TEXTILE INSTITUTE* (England).

"This book . . . is abreast of the latest technical developments and research. Its value is increased because of the lack of books in this field today . . . we can readily recommend this book to all technical and practical men"—*MELLIAND TEXTILBERICHTE* (Germany).

"This monograph contains the work of many mill-experienced authors, plus good, sound chemical and application principles developed in the laboratories and mills enjoying AATCC membership. . . . This book puts between two covers much information that a dyer is constantly searching for. It is a good investment for any laboratory, dyehouse, or printshop."—*TEXTILE WORLD*.

". . . this monograph should be in the hands of every user of vat dyestuffs, every student and every teacher. The book is well indexed and includes valuable lists of equivalent trade names. It will certainly take its place as a standard book of reference."—*JOURNAL OF THE SOCIETY OF DYERS AND COLOURISTS* (England).

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Minutes——

One Hundred and Eighty-Fourth Meeting
TECHNICAL COMMITTEE ON RESEARCH

THE 184th meeting of the Technical Committee on Research was held on Friday afternoon, June 17, 1955 at the Hotel Statler, New York, N Y.

Those in attendance were: Charles W Dorn, chairman; Charles A Sylvester, vice chairman; Matthew J Babey, secretary; Leonard S Little, chairman of the Executive Committee on Research; Harold W Stiegler, director of research; and R C Allison, W D Appel, O C Bacon, C R Caryl, C Z Draves, R R Frey, L Fusser, P J Fynn, H E Hager, L L Heffner, W A Holst, R W Jacoby, W Klaas, T Larson, E A Leonard, J Lebarthe, O F Marks, J E Norton, A D Nute, C N Rabold, R E Rupp, F J Rizzo, V S Salvin, W M Scott, J E Smith, R B Smith, R H Souther, and A F Tesi.

Mr Little advised the Committee that Council had approved a research budget of $65,000 for the year beginning August 1st. He expressed the hope that the budget would be increased to $75,000 in the future. Plans for a replacement for the late Edwin P Johnstone, additional help for the Lowell staff, and a pension and insurance program for the staff were outlined by Mr Little.

Following Mr Little's remarks, R W Jacoby, AATCC president, complimented Messrs Kaswell, Dorn, and Fynn, and Dr Stiegler, for their work at the most recent atomic bomb tests in Nevada. A complete report by this "team" will be given at the Committee's next meeting in Atlantic City.

Chairman Dorn announced that the Laurin and the Cummings flammability testers would be sent to Lowell for comparison with AATCC's instrument. This was followed by a discussion of the New York State Flammability Law, which went into effect July 1, 1955. A motion was made that ECR inform the National Fire Protection Association that AATCC would not initiate any new work on the subject of flammability, but would be willing to participate in any further work on the variable-angle tester.

It was announced that the Committee on Small Color Difference has been disbanded and its work assigned to the Committee on Color, with Frank J O'Neil as chairman.

Mr Dorn also announced the formation of a new committee on analytical methods with P J Wood as chairman. Mr Wood defined its objective as "the devising or selecting of a satisfactory standard method for determining the reducing activity of sodium hydrosulfite." It was agreed that the method should be simple, accurate and reproducible. A list of known methods will be distributed at the next TCR meeting, and the most likely will be selected for evaluation in the laboratories of companies represented on Mr Wood's new committee.

Dr Stiegler announced that the special work on the staining of multifiber test cloth of AATCC Wash Test #3 and Accelerated Wash Test #3A, plus the effect of using soap and detergent in said tests, has been completed by the Lowell staff and the results turned over to Mr Fynn. He also announced that the work on the light- and wash-test combination is nearly complete.

Following Dr Stiegler's remarks, the various subcommittee officials reported as follows:

SNAG RESISTANCE TEST—— Chairman J E Smith reported that this subcommittee has been engaged in two studies:

1) The application of the current tentative test method in evaluating the snag resistance of 10-denier-nylon hosiery; and

2) A program to define as specifically as possible the significance of the snag-resistance test in terms of correlation with experience in mill handling during and after finishing as well as experience in consumer use as illustrated by wear tests.

Copies of a questionnaire on the current tentative snag test method were circulated among 54 of the largest manufacturers of women's hosiery, which in the opinion of Reuben C Ball, vice president of the National Association of Hosiery Manufacturers, probably have testing departments. Thirty-eight of these mills were classified as having branded lines, with the remaining sixteen having unbranded. Of 25 replies received, thirteen mills stated that they use the test and twelve stated that they did not. This supplements information from six firms engaged in testing or chemical manufacture which use the test.

The Committee has tentatively concluded that a) the test is used primarily in experimental work which requires the assessment of properties of new finishes; b) the test gives a rank correlation in terms of defects observed in mill handling, ie, stockings which have a low snag index by this test show fewer snags in mill operations; and c) a rank correlation is also obtained with performance in consumer use. It is to be remembered, however, that there are other important factors which influence wear test experience.

In connection with both b) and c), it is the Committee's belief that snag-test comparisons are valid within a given hosiery construction, but not between different constructions.

The current tentative test method appears to be generally accepted as applicable to hose of 15- and 30-denier yarns, but on the basis of returns from the questionnaire, its use is doubtful for 10-denier constructions. The use of 280A paper may make the method acceptable for these sheerer hose.

The Committee plans to investigate the application of an adaptation of the current snag test method in evaluating snag resistance of stretch hosiery made from nylon yarn. In addition, the Committee plans to determine if some simple procedure can be devised for mechanically drawing the hosiery over the sandpaper.

FADING OF DYED TEXTILES DUE TO ATMOSPHERIC FADING—— Chairman V S Salvin reported that this subcommittee has accepted the new supply of standards. It will investigate ozone fading ("O-Fading"). These tests will be carried out using natural conditions as well as instrument testing. At the suggestion of the Committee on Fastness to Light, AATCC Wool Blue Standards for Light will also be used in the tests.

FASTNESS TO WASHING——— Chairman P J Fynn reported that the results of tests for checking the staining of multifiber test cloth by Wash Test #3 and by Accelerated Wash #3A, respectively, are quite similar.

The wash tests using soap and detergent have been completed and are being studied. A report will be written soon.

STANDARD SOILS——— Chairman O C Bacon announced that a report will be written on the available soils. The Committee does not intend to develop a soil, but will evaluate any new soil by the present method. Work will be concentrated on those soils applicable only for textiles.

CONTINUOUS WOOL-SCOURING PROCESSES———Chairman pro-tem E A Leonard reported that it has been established, almost without doubt, that chlorophyll pigments are the light-fugitive elements in sheep dung which, when present on wool after scouring, cause rapid fading toward the violet. Techniques for minimizing chlorophyll content in dungy wool have been demonstrated. These methods consist mainly of vigorous opening and dusting processes before the raw wool is scoured. A practical commercial process for destroying residual chlorophyll pigments has been demonstrated. This calls for carbonizing followed by bisulfite reduction and is to be done continuously.

The Committee will prepare a paper for publication covering work to date. Questions involving chlorophyll contamination from scources other than sheep dung will be investigated. These possible scources include algae in water supply and vegetable-matter contamination in wool.

COLOR———C Z Draves, reporting for the chairman, stated that a list of definitions has been drawn up for publication.

FASTNESS TO LIGHT———Chairman R C Allison reported that necessary corrections on the Wool Blue Standards have been completed. Inter-laboratory tests will be made, and if these prove satisfactory, the revised standards will be ready by September. Details on the distribution of the new Wool Blue Standards will be worked out by M J Babey and the Marketing Committee. Mr Allison complimented Frank J Rizzo on his excellent work in preparing the new standards.

It was announced that the sunlight survey is about to get underway.

In outlining the work of the ISO, W D Appel announced that there is a possibility that the ISO Subcommittee on Fastness will meet in New York during the week of the Perkin Centennial. At that time, TCR should have investigated the daylight test tentatively adopted by the ISO subcommittee. Plans are underway to obtain the new European Blue Standards to use in this survey.

EVALUATION OF DURABLE FINISHES———Chairman E R Kaswell reported that this committee has been investigating wrinkle resistance and crease retention of fabrics only. He added, however, that requests of late have called for evaluation of the effects of washing, drycleaning, and many other conditions on durable finishes. Mr Kaswell, feeling that this kind of survey should be conducted jointly with other committees who are better equipped to handle it, suggested the formation of a new committee to evaluate such requests.

Following Mr Kaswell's report, Frank J Rizzo of the Quartermaster Research and Development Command, Natick, Mass, presented an abstract of the original OD#7 study. He gave a complete history of why and how the project came about, and praised AATCC for its role.

A summary and conclusion of the work follows:

> The work reported suggests that, for any given dye method chosen, a set of preparatory conditions can be found which will result in the highest degree of color fastness possible for any given dye formulation. It is believed that the important consideration is proper distribution of the dye in relation to the fiber surface energy. Once this is achieved, whatever is the method, the color fastness will be the best which a specific dye formulation will allow.
>
> Within the preparation phase of this study it has been demonstrated that methods of boil-off influence color fastness to about the same degree, but that in general, the kier boil is more effective than the progressive open boil-off, and this in turn slightly better than the Mathieson method.
>
> The greatest contribution to color fastness is made by the degree of mercerization. Increasing the concentration of the caustic soda induces increased color fastness, but the effect reaches a maximum at moderate caustic concentrations. Mercerization of the fabric while wet as it enters the caustic solution produces a lower degree of color fastness presumably because of the dilution factor. The sequence of boil-off and mercerization is not too important but there seems to be some evidence that the boil-off after mercerization tends to counteract the effect of the mercerization on color fastness.
>
> Chlorine bleaching produces poor color fastness to laundering and to scrubbing.
>
> Among the dye methods the padjig method results in the highest degree of color fastness of the four methods explored. The continuous booster method shows the poorest resistance to scrubbing and to laundering.
>
> The effect of the water-repellent treatment is beneficial in maintaining color fastness and is more effective on those of lower initial color fastness than on those of initially high ranking. The resinous types have a stronger effect than do the cationic types. This is particularly true in laundering in the presence of chlorine.
>
> In addition, these studies have pointed up certain other factors which are worthy of mention here:

a) Colorfastness properties that are essentially derived from the dyestuffs themselves (such as fastness to perspiration, salt water, etc) are not perceptibly influenced by either preparation or dyeing factors so long as a reasonable measure of dye-to-fiber bonding is realized and the dye has been properly oxidized and soaped.

b) Fastness to light and to weather is reasonably reproduced in exposure undertaken at different seasons provided the comparison is made on an energy basis rather than on time of exposure.

c) Strictly weather factors, as well as radiation, have marked effect on the fade differing with the nature of the prepare to which the fabric has been subjected.

d) Determination of the first break in the color during exposure is not necessarily indicative of light or weather fastness. In order to evaluate exposure fastness properly in terms of end point characteristics, it is necessary to determine the appearance not only at the initial break, but also at the point where the slope of the fading curve begins to assume the complexion of final destruction. In these studies, it has been demonstrated that in the vat dye system utilized the initial point corresponds to 15,000 Langleys (approximately equivalent to thirty days June sunlight in Florida). The second point is approximately at 33,750 Langleys.

e) The general characteristics of the exposure curves are the same regardless of prepare or of method of dye application; that is, all showed definite changes in slope at approximately the two critical points mentioned above.

(A complete report of the above work appears in the August 3, 1953 issue of *Am Dyestuff Reptr 42*, No. 10, page P492.)

Respectfully submitted,

M J BABEY, *Secretary*

NOTICE TO AUTHORS OF PAPERS

MANUSCRIPTS for the *Proceedings* and for other publications of the American Association of Textile Chemists and Colorists shall conform to the requirements and standards given in this *Notice*. Before publication, manuscripts for the *Proceedings* shall be approved by the Editor, not only for editorial correctness according to the standards of this *Notice*, but also for content of technical matter. In his work, the Editor may enlist the aid of anonymous reviewers who are selected for expert knowledge in particular fields.

It is presumed that authors in studying the comments of reviewers and of the Editor will remember that all recommendations are made in a kindly, helpful, sympathetic manner to improve the paper in both literary and technical excellence. Although authors should cheerfully consider suggestions, they are expected to defend their position if justified, especially when strictly technical matters are involved with which the authors have an intimate knowledge.

MANUSCRIPTS—Manuscripts shall be typewritten double-spaced with approximately one-inch margins on 8.5 x 11-inch white paper. In addition to the *original*, at least one carbon copy is required. Pages are to be numbered consecutively with Arabic numerals, and each page after the first shall carry the authorship at the very top. Tables and figures shall also be numbered consecutively, the tables with headings containing Roman numerals as TABLE I, TABLE II, etc, and the figures with Arabic numerals as Figure 1, Figure 2, etc, appearing *below* the figures. The names of the authors and their laboratories or business connections should appear below the title of the paper.

ARTICLES APPEARING IN THE "PROCEEDINGS" IN RECENT ISSUES OF THE "AMERICAN DYESTUFF REPORTER" will be helpful to authors as models of form for the typing of manuscripts.

LITERARY STYLE AND FORM OF PRESENTATION—In the writing of papers, authors are requested to observe a trenchant, simple style of writing directed to textile chemists and colorists with at least an elementary knowledge of chemistry, physics, mathematics, engineering, textile processes and textile machinery.

In the organization of the material, there should be one or more introductory paragraphs setting forth the occasion, significance and main objectives of the paper and of the method of attack. This should be followed by the body of the presentation, either with discussions interspersed throughout this portion or with a collected section marked "DISCUSSION" after the main body of the paper. Finally, there may be a brief section at the end entitled "SUMMARY" of "CONCLUSIONS."

Center and side headings make for easier reading. Center headings should be employed sparingly and generally will include only very important section headings, such as "INTRODUCTION," "EXPERIMENTAL," "DISCUSSION," "CONCLUSIONS," "SUMMARY," and "REFERENCES." Side headings (see third paragraph of this *Notice* for an example) shall be indented and run into the text to which they apply, and shall be separated from the paragrpah by a dash. The publisher will print center headings in bold-face capitals and side headings in capitals.

LITERATURE REFERENCES AND FOOTNOTES—References to the literature and all footnotes (except those in tables) shall be numbered consecutively with underlined Arabic numerals in parentheses at the proper place in the text. Where a reference or footnote is to be used again, the original number is simply repeated; this obviates the necessity of repeating the footnote or reference at the bottom of the page. References to the literature shall conform to the universal usages followed by *Chemical Abstracts*, which include underlining of book and journal names to indicate italicization in printing.

The spelling and rules of punctuation followed in manuscripts shall be those found in the *Merriam-Webster New International Dictionary;* abbreviations and chemical formulas shall conform to *Chemical Abstracts*. Periods shall be used only at the end of sentences, not after abbreviations.

FIGURES AND GRAPHS—Figures and graphs should be black line drawings on white drawing paper. Photographic prints are acceptable, preferably glossy prints on double-weight paper. Duplicates should be available for dispatch to reviewers. Diagrams and graphs should preferably be designed in long form to cover one column of print but may be two columns wide or the width of a full page where necessary. In graphs the frame and actual curves should be inked more heavily than the co-ordinate lines, and these latter should not be too close together. Various styles of broken lines are sometimes desirable to distinguish curves. Experimental points should be given with small plane figures, such as circles, squares, diamonds or triangles. Numbers and legends on co-ordinate axes are to be lettered in the graph by the author. Numbers and titles of figures should be placed below the diagram or on the edge of the back. Each piece of illustration copy should bear on the margin or on the edge of the back the name of the author and the title of the paper.

Photographs of authors should be included with copy, to be run in conjunction with the paper. These must be on glossy stock, and should be large enough for proper reproduction.

TABLES—Tables should not be used indiscriminately because they are very expensive to set up in type. They should be designed to be one column, two columns or three columns wide. Tables should be arranged with the view of conserving space; column headings should be short and abbreviated. Quantity designations shall never appear in the body of the table but in the headings. Tables, if possible, should be placed in the manuscript where they belong rather than separately.

SYNOPSIS—A separately written synopsis of not over 200 words containing the gist of the subject matter must accompany every manuscript.

GALLEY PROOFS—Galley proofs will be sent to the author by the publisher for correction before publication. This should not be interpreted as an invitation to rewrite the paper but rather as an opportunity to correct errors.

REPRINTS—Fifty reprints of papers published in the *Proceedings* will be furnished without charge by the publisher if requested when galley proofs are returned. These reprints are printed on one side of the sheet only and then stapled together. A schedule of prices of reprints in the usual form accompanies the galley proofs.

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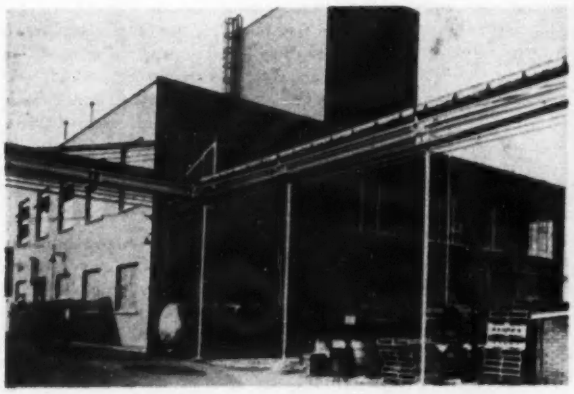
TRADE-MARKS — As the AATCC wishes to co-operate in the protection of trade-marks, it is requested that, in the body of the article, trade-mark names be written with an initial capital letter. Courtesy demands that authors include competitive products as well as those of his firm. Many current trade-mark names are to be found in the *AATCC Technical Manual and Yearbook*.

News of the Trade



The new non-electroylic hydrogen peroxide plant building

Interior view of a portion of Becco's Buffalo, N Y, electrolytic process hydrogen peroxide plant

• Becco Expands Hydrogen Peroxide Facilities

Multi-million dollar plant expansion programs involving the hydrogen peroxide producing facilities at Buffalo, N Y and Vancouver, Wash, of the Becco Chemical Division, Food Machinery and Chemical Corporation, were announced last month by M E Bretschger, Divisional President.

Becco's Vancouver plant, a facility for the electrolytic production of hydrogen peroxide, will be enlarged by approximately 50% at a cost estimated to be more than one million dollars. Contracts have been signed for the construction of the necessary buildings and the installation of the equipment. Production is anticipated in the early part of 1956.

The Buffalo expansion is indicative of Becco's search for production procedures which would not be limited by such factors as the availability of electric power or certain critical materials. Over the past fifteen years, Becco has spent several millions of dollars perfecting a low cost non-electrolytic process. These efforts have culminated in the recent "on stream" operation of the Division's new non-electrolytic producing unit located at Buffalo. The first tank car of hydrogen peroxide produced in this plant was recently shipped to a consumer.

Buffalo Electro-Chemical Company, Inc, predecessor to the Becco Chemical Division, is said to have been the first to introduce the electrolytic process in the United States. Today, Becco is believed to be operating in its Buffalo and Vancouver plants the country's largest total capacity employing this procedure.

• American Delegation to Attend International Wool Conference

Ten US wool research leaders, including three members of Department of Agriculture staffs, are scheduled to attend the International Wool Textile Research Conference in Australia, August 22-September 9.

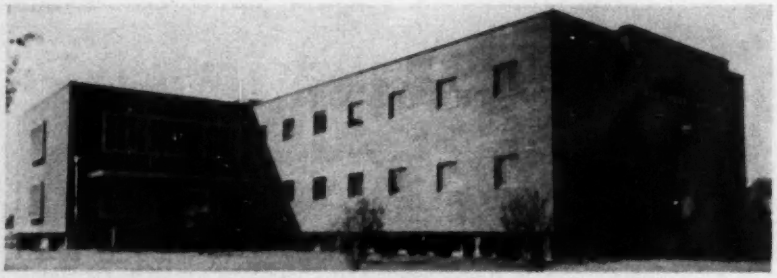
The conference, sponsored by the Commonwealth Scientific and Research Organization with the co-operation of the Australian Wool Bureau, will be held at three research centers operated by the CSIRO. More than 100 wool research leaders from all parts of the world are expected to attend. An 800-mile tour of leading Australian wool-producing centers is planned in conjunction with the Conference.

Meetings in Sydney will include reports on studies on soluble proteins, the elastic properties of wool, the histology of the sheep follicle, dyeing and finishing, and the reactivity of the disulfide bond in proteins and peptides; a discussion of "Problems of the Producer and Biologist in Meeting the Needs of the Textile Industry;" a series of papers on subjects relating to wool manufacture; papers reviewing physical properties of wool fibers, yarns and fabrics, and a public lecture on "The Future of Wool" by J B Speakman of Leeds Unniversity.

Among the subjects to be covered at the Geelong meetings will be the fine histology of wool and hair, the interaction of wool and water; wet processing of wool; and the amino acid and functional group analysis of proteins. A symposium with wool textile manufacturers will also be held in conjunction with the Geelong sessions.

Sessions to be held in Melbourne will feature papers on the bilateral structure of wool, amino acids and peptides, X-rays and infra-red investigations of protein structure, and enzyme and protein chemistry. The chemical modification of wool, and shrinkproofing and mothproofing of wool will also be covered in reports. A series of lectures by leading wool research scientists will also be held in conjunction with the Melbourne meetings. Among speakers will be E G Carter, director of science and technology of the International Wool Secretariat, who will deliver a public lecture at the University of Melbourne.

United States wool research leaders who are planning to attend the international meeting are: J H Dillon, director, Textile Research Institute; Robert B Corey, Gates & Crellin Laboratories, California Institute of Technology; Henry Eyring, dean of the Graduate School, University of Utah; Harold P Lundgren, head, Protein Section, Western Utilization Research Branch — United States Department of Agriculture; Elroy M Pohle, in charge, Livestock Division, Agricultural Marketing Service — United States Department of Agriculture; Claire E Terrill, director, Animal and Poultry Husbandry Research Branch, Western Sheep Breeding Laboratory — United States Department of Agriculture; Emil Smith, University of Utah College of Medicine; Gerald Laxer, director of science and technology, The Wool Bureau, Inc; John H Menkart, assistant director of research, Textile Research Institute; and Herbert F Schiefer, Textile Section, National Bureau of Standards.



Twitchell Memorial Laboratories, Cincinnati, Ohio

• Twitchell Memorial Labs in Operation

Research aimed at the development of new and improved products and processes in the fats and oils field will now be conducted in the new Twitchell Memorial Laboratories recently completed by Emery Industries, Inc, Cincinnati, O.

Dedicated to Dr Ernest Twitchell, Emery's first research chemist, and built at a cost of over $800,000, the new three-story, L-shaped building provides 30,000 sq ft of floor space for 28 individual laboratories. In it are housed the new chemical labs, the fatty acid and esters labs and the textile labs of the Research Department, plus the Chemical Engineering Department and the development and service labs. All are completely air-conditioned.

These facilities and the special application laboratories on the ground floor are equipped for basic research on products and plant processes and for evaluation of Emery's fatty acids, plasticizers and textile oils.

There is also a special laboratory and a small-scale drycleaning plant for study of Emery's latest developments in connection with its Sanitone Service.

The new research center also includes an up-to-date library, which is equipped with all modern visual aid devises. Executive offices and a conference room are also in this section of the building.

The ribbon-cutting ceremonies, which officially opened the Twitchell Memorial Laboratories on June 13th, were conducted by John J Emery, president, assisted by the mayor of Cincinnati and other local civic leaders. Emery's board of directors and division heads were also in attendance. A "family preview" held a day prior to the opening ceremonies was attended by over 600 Emery employees.

• Acrylonitrile Price Reduction

American Cyanamid Company has reduced the tank car price of acrylonitrile from 31 to 27 cents per pound. This price reduction is the most recent in a series (portedly made possible by new production processes employed at Cyanamid's recently completed Fortier Plant.

• Dobeckmun Plans New Plant

Thomas F Dolan, president of The Dobeckmun Company, manufacturers of Lurex metallic yarns, has announced plans for a 10,000 sq ft plant to be erected on a 17-acre site recently purchased in Cleveland near Brookside Park. The building will be occupied next November by the sales and manufacturing units of Dobeckmun's Industrial Products Division. Building and equipment will require an estimated investment of $1,750,000.

Executive offices and the Packaging Division of the company will continue to occupy Dobeckmun's main plant, at 3301 Monroe Avenue, Cleveland.

• PTI Adopts Largest Budget

The largest budget in the history of the Philadelphia Textile Institute was adopted recently at the annual meetings of the Institute and The PTI Foundation. One of the features of the new budget was the addition of a pension plan for the staff and faculty of the Institute.

The PTI Foundation Corporation re-elected the following to serve on the board of trustees for 3 years: Millard D Brown, Continental Mills, Inc; A Vinton Clark Orinoka Mills, Inc; Theodore B Hayward, Franklin Parkway Bldg Co; W Lyle Holmes, Jr, Archibald Holmes and Sons; Everett L Kent, Kent Mfg Co; Edwin G Michie, Andrew Y Michie and Sons; Philip J Schlosser, Schlosser Mfg Co; Stanley I Sheerr, Philip L Sheerr and Sons; and Fred C Scholler, Scholler Bros, Inc.

The board re-elected Mr Scholler president, Mr Hayward, 1st vice president, Mr Kent 2nd vice president, Richard Cox of PTI treasurer, and Russell C Osborne, R C Osborne Co, secretary.

New additions to the PTI Corporation board of trustees are Richard B Stehle, Allegheny Dye Works, and Wesley Heilman, Gibbs Underwear Co.

The latter board elected the following officers: Mr Holmes, chairman of the board; Bertrand W Hayward, PTI, president; Mr Scholler, 1st vice president; Ralph Whitaker, Fred Whitaker Co, 2nd vice president; and Julius Zieget, Philadelphia Museum School of Art, secretary-treasurer.

• New Line of GLF-dyed Acetate Fabrics

Catalan Fabrics, Inc, New York, and Eastman Chemical Products, Inc, Kingsport, Tenn, report complete success in utilization of Eastman's GLF dye series on a new line of decorative fabrics, known as the "Jeweltone" solid color decorative fabrics.

It is reported that the fabrics will retail for less than $1.00 a yard. The new line of all-acetate bedroom fabrics, which will be available in 12 colors as ready-made draperies, bedspreads and vanity skirts, can also be had by the yard in 45-inch widths. The name stems from their glossy jacquard effect due to the numerous jewel-like reflecting surfaces.

80-hour Fade-Ometer tests reportedly indicate that these fabrics compare favorably with vat-dyed fabrics; four cycles of gas-testing are said to have produced no color change; and all are reported satisfactory in regard to washability and drycleaning.

• Avisco, Cyanamid Announce Additional College Programs

American Cyanamid Company and American Viscose Corporation recently revealed further details on their respective college program plans for the academic year 1955-56.

Cyanamid will award 17 undergraduate scholarships and 14 graduate fellowships in chemistry and chemical engineering, while Avisco will offer 19 fellowships for graduate work and 19 undergraduate scholarships in various fields.

Under Cyanamid's undergraduate scholarship program, now in its second year, junior or senior students selected by their college authorities will receive $600 each for the academic year, while the school will receive $300 for the unrestricted use of its chemistry or chemical engineering department. Under the fellowship program, Cyanamid will award $1500 plus full tuition and laboratory fees to graduate students in their final pre-doctoral year. The college's chemistry or chemical engineering department will receive $300 for unrestricted use. In addition to the foregoing, Cyanamid's aid-to-education program is currently providing funds in excess of $600,000 annually.

American Vicose has added five more institutions to its College Relations Program, bringing the new total up to thirty-four. The fellowships are in the fields of chemistry, chemical engineering, accounting and pulp technology. The 19 scholarships, awarded primarily to undergraduates entering their junior year, are in textiles and textile technology, chemistry, chemical engineering, business administration, engineering, physics, accounting, and mechanical engineering.

Butterworth Milestone

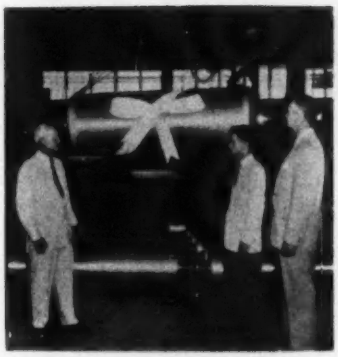
H W Butterworth & Sons Co, Bethayres, Pa, last month announced that its dryer division had completed the manufacture of drying cylinder No. 75,000. Butterworth's Drying Machinery Division is reported to be the world's largest producer of cylinders for the textile industry.

The 6-foot long, 300-lb drying cylinder was part of an order for the Delta Finishing Co Division of J P Stevens Co, Clemson, S C. Carl Schmidt, Jr, of J P Stevens Co, took part in the ceremonies.

J P Stevens Co plants are reported to have 389 Butterworth drying cylinders in operation, with an order for $25,000 of additional cylinder drying equipment having been placed.

J Ebert Butterworth, president, and DeHaven Butterworth, vice-president, represented the Butterworth organization in the ceremonies.

The Drying Machinery Division of the Butterworth plant utilizes a reported $160,000 worth of specially designed equipment for the fabrication of drying cylinders. Cylinders are copper or stainless steel, with heads of carbon steel and shafts of cast iron and carbon steel. A unique seam-welding technique is said to make it impossible for the human eye to detect seams after the cylinders are polished.



De Haven Butterworth (left) presents the 75,000th drying cylinder made by the Drying Machinery Division of H W Butterworth & Sons Co to Carl Schmidt, Jr (center), of J P Stevens Co. Looking on is J Ebert Butterworth, president of the Bethayres firm

According to J Ebert Butterworth, more than 25,000,000 lbs of metal have been used in the manufacture of the 75,000 drying cylinders. "On this occasion we point with pride to the fact that Butterworth has made more drying cylinders for the textile industry than all other manufacturers combined," said Mr Butterworth.

• Prices Reduced on Ethyl Silicates

New lower prices for condensed ethyl silicate, ethyl silicate 40, and tetraethyl orthosilicate have been announced by Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation. The new prices represent reductions of two to three and a half cents per pound.

• Lower Price for TODI

The Carwin Company, North Haven, Conn recently announced a substantial reduction in the price of TODI (bitolylene diisocyanate) in recognition of the widespread attention it has attracted in the development of the new polyurethane synthetics.

TODI has been found to impart excellent toughness and abrasion resistance to many polyurethane systems made from it. In addition, its relatively high melting point is associated with a low order of volatility, which minimizes hazards from vapor exposure in its use for the fabrication of such systems.

TODI is now being offered at $1.50 per lb in ton lots, $2.00 per lb in standard drums, and $2.50 per lb in less than standard drums. Truckload quantities will be supplied upon reasonable notice at $1.50 per lb.

• NEW PRODUCTS AND DEVELOPMENTS •

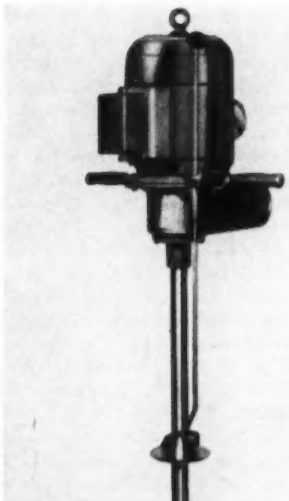
• Gabb to Show New Mixer at Atlantic City

Gabb Special Products, manufacturers of the new portable type mixer called Shear-Flow, are planning to introduce their new ¾ HP laboratory model mixer at the 1955 National Convention of AATCC in Atlantic City next month.

To be used primarily in laboratories for pilot mixing or for small batches, the smaller Shear-Flow is available on an adjustable counter-weighted stand.

The ¾ HP laboratory model operates under the same principle as the larger Shear-Flow Mixer. The mixing head consists of two impellers and a stator spaced closely together. The two stainless-steel impellers turn in opposite directions and create a pumping action which moves the material from the bottom upward through the veins of the stainless-steel stator. As the impellors, which are spaced .005" apart, turn in opposite directions, a shearing action takes place which breaks up and disperses any particles that are present.

The new mixer, the company claims, would speed up many mixing operations.



Gabb ¾ HP Laboratory Model Mixer

• Lange Reflection Densitometer; Glossmeter

Epic Inc, 154 Nassau St, New York 38, N Y, American representative for Dr B Lange Co, West Berlin, Germany, has disclosed details details of two photo-electric instruments of interest to the textile trade —the Lange Reflection Densitometer and the Lange Glossmeter.

Dr Lange Reflection Densitometer is designed to determine rapidly and objectively by reflected light, the density, color and proportion of white content of fabrics. The instrument is said to be sufficiently sensitive to indicate variations in density or color of 0.1%, while permitting the measurement of details down to 0.04" dia.

Dr Lange Glossmeter measures gloss and polish on textiles, wax, lacquer, etc.

Both instruments operate at 110 volts, 60 cycles, and each weighs 1 lb, 6 oz.

Terminals are provided for the connection to any sensitive pointer micro-ammeter or galvanometer for reading of the photo-electric current, which is directly proportional to the measured value.

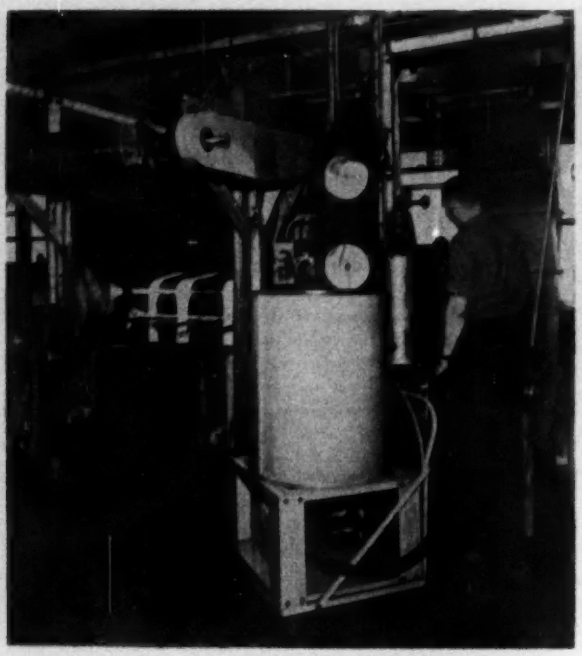
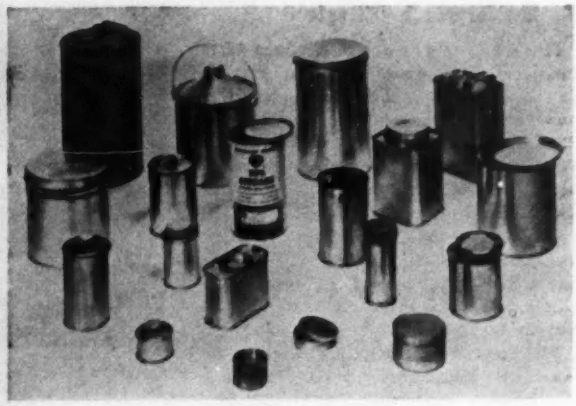


Photo shows dye solution being transferred from Pako Hydromixer to dye beck storage tank



Ellis Line of Packing Cans

• Pako Hydromixer

A system for mixing solutions in the dyehouse or finishing room, which is claimed to save up to 84% of mixing time, has been announced by Pako Corporation, 1010 Lyndale Avenue North, Minneapolis, Minn.

By means of a compact unit known as the Pako Hydromixer, crystalline or powdered substances may be quickly and thoroughly mixed into solution by jet impingement, it is claimed. Length of time depends upon the solubility of the dye or other substance. The manufacturer points out that 5 to 50 gallon batches may usually be mixed in 10 minutes or less. No steam or heat is used in the mixer. The stainless-steel circulating pump and jet tube do the mixing.

The Model 50T Hydromixer is equipped with a rolling truck for portability. The machine is entirely self-contained and needs only to be plugged into any electrical outlet to start operation.

The mixing tank and pump is made of type-316 stainless steel. The unit may be used as a storage tank until dye or other solution is needed. A dust cover protects the mixture from contamination. Solution is transferred by pump from Hydromixer to storage container on the dye beck in from 1 to 2½ minutes depending upon size of batch. It is pointed out that, with no paddles or moving parts in the mixing chamber, tank and pump are easy to flush and clean. Only the motor and pump have moving parts.

Primarily designed for the dyehouse, the unit is said to be equally desirable in the finishing room or wherever a large volume of solids must get into a small volume of solution.

• Advance in Alkylolamide Detergents

Ninol Laboratories, Inc, by modification of a basic process used in the manufacture of alkylolamide detergents, has made possible an increase of the amide content of the amine condensates to about 90-95% it is reported. Most of the other components are eliminated. As a result, a new series of detergents, called the Ninol "Extra" series, has been introduced.

The basic process used in the manufacture of alkylolamide detergents was first described in Ninol's U S Pat No. 2,089,212, which disclosed their synthesis from fatty acids and ethanolamines. These amine condensates exhibited unusual thickening and foam-stabilizing properties and rapidly attained considerable importance in the nonionic surfactant field. Although these products consisted mainly of alkylolamides, there was also a certain amount of ester-amide formed during the reaction, together with some diethanolamine held in a physicochemical complex of some type.

The new Ninol "Extra" series is said to exhibit even higher foam-stabilizing and thickening properties than formerly.

Literature on the new series may be obtained from Ninol Laboratories, Inc, 1719 South Clinton St, Chicago 16, Ill.

• Chemical Storage and Shipping Cans

George D Ellis & Sons, Inc, American and Luzerne Sts, Philadelphia 40, Pa, has announced the development of new facilities for the production of special metal cans for packing chemical and related products.

A wide range of sizes and styles is available from $\frac{1}{16}$-oz to 50-lb capacity, in round, square or oblong shapes. Closures and handles are designed to suit the form or use of the product, ie, liquid, paste, granular, powder, cake, etc.

Container materials include tinplate, brass, copper, stainless steel, and Monel. Screw caps can be furnished with brushes attached, and single- and double-cap spouts are available. The Company also supplies special cans for volatile chemicals, such as ether and chloroform.

Wood jackets or cases conforming to ICC regulations may be supplied if required for shipment of filled cans in interstate commerce. Inquiries should name the product to be packed, and should include all available data on physical properties, performance requirements and end use.

• Fashion and Furniture Promotion To Be Launched

Dow Corning's Sylmer silicone finish for decorative and upholstery fabrics teams up with Collins & Aikman and the Simmons Company in a promotion scheduled to make its bow in specialty and department stores throughout the country this September. The theme—"Care-Free Fashions"—highlights the first major promotional tie-in of its kind between fashion and furniture and Sylmer-treated fabrics. An elaborate promotional campaign will dramatize the "Care-Free Fashions" theme featuring a Simmons Hide-A-Bed sofa covered with Sylmer-treated fabric from the Candalon group by Collins & Aikman, and a lady's coat, designed by Harry Frechtel in a Sylmer-treated worsted velour fabric.

• Cyana* Soil Retardant

Cyana* Soil Retardant, production of which was announced recently by L A Fluck, manager of American Cyanamid Company's Textile Resin Department, is now available to rug manufacturers for application in the mill on all types of fibers.

Cyanamid cites tests which reportedly show that when rugs that have been treated with the compound are subjected to dirt and soiling by being walked on and by exposure to normal air bourne dirt and soot, they will stay clean up to five times longer than untreated rugs, tested under identical conditions. It is claimed that treated rugs, vacuumed or shampooed, clean easier and more thoroughly than the untreated rugs. Cyanamid points out that the new Cyana* Soil Retardant does not impair the smoothness or softness of the surface, and does not cause the sort of "dusting" that was characteristic of some early types of soil retardants. Among other advantages attributed to this compound is freedom from tendency to discolor or absorb stains from certain types of rug backing. It is said to have little or no effect on the light fastness of dyes.

The new compound acts by filling the roughnesses on the fibers with a microscopic material, which is said to prevent soil from clinging to the fibers, while making it easier to remove dirt that accumulates in the rug.

*Reg Trademark of American Cyanamid Co.

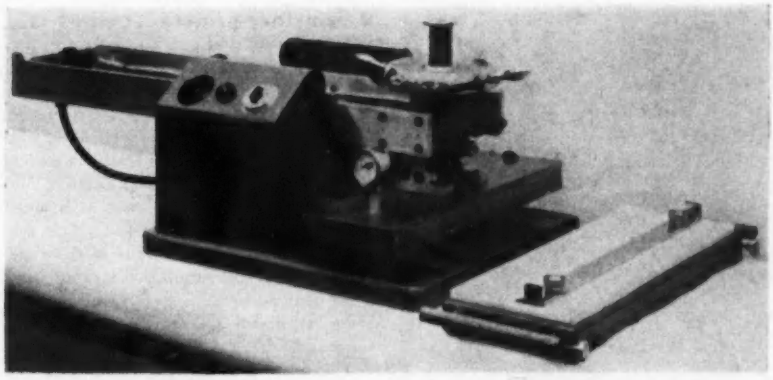
• Cochrane Dealkalizer

Designed and manufactured by Cochrane Corp, Philadelphia 32, Pa, a new dealkalizer utilizes the ion-exchange principal of salt splitting as an effective means of reducing alkalinity in boiler feed and process water.

The Cochrane process, which substitutes chloride ions for bicarbonate, carbonate, sulfate and nitrate ions, is said to reduce water alkalinity by over 90%. Since no carbon dioxide is formed, no aeration of the water is subsequently required. Dealkalizing provides continuous water treatment under pressure and no pumping is required.

The dealkalizer unit utilizes a strong basic anion resin which is regenerated with either sodium chloride or a mixture of sodium chloride and caustic soda. The process is semi-automatic with a single Cochrane Solo Valve or Hydromatic Valve handling the entire regeneration cycle. Completely automatic cycling is possible by the use of a meter on the effluent and a Cochrane Hydromatic Valve, electrically operated.

The Cochrane Dealkalizer is available in a wide range of sizes. Complete information is contained in Publication 4567, available from Cochrane Corp.



Frank Pressing Tester for measuring dimensional change

• Buegelprobeapparat No. 627

The Buegelprobeapparat No. 627, a new pressing tester to measure dimensional change in shrinkage of fabric, is being marketed by Karl Frank GmbH Messezeug und Pruefmaschinenbau, Weinheim-Birkenau, Germany. Allied Technical Corp, Detroit, Mich, is representing Frank in this country.

The new device has a press iron, 9" x 25", which is movable on a horizontal metal bar running on rollers, and which can be turned 90 degrees. Of the same shape, and also turnable 90 degrees, is the pressing table on which the fabric is placed. It has a 0.8-inch-thick felt pad and a thin perforated bronze sheet. For absorbing condensed water, the surface is perforated. The draining system of the table is said to keep the felt pad almost entirely dry on the surface.

The fabric is placed on the table where metal clamps hold it tight and even. Chalkmarks are then applied parallel across the section of fabric to be tested. This section is then covered with a cotton cloth moistioned at the rate of about 600 grams of water per square yard.

The heated iron, which is kept at 220° C by thermostat control, is lowered by handwheel until it rests by its own weight on the covered fabric. After 15 seconds, the iron is removed.

Fabric is then taken off the table and placed on an even base, where it must rest for at least an hour to regain normal hygroscopic moisture grade of 65 percent.

The pressed section of fabric, recognizable by the chalkmarks, is then measured by a measuring scale, which indicates the shrinkage of the fabric in percentage.

• Keracule Process Upgrades Chicken Feathers

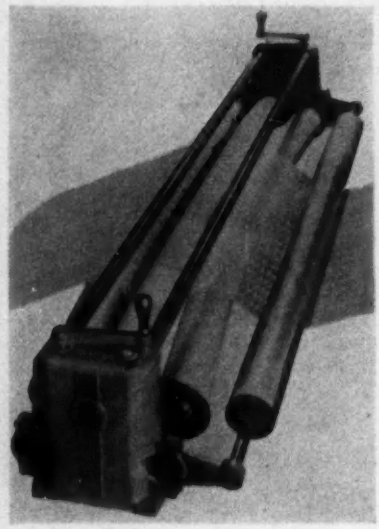
The Keracule process, a method developed by the research and development department of Alexander Smith, Inc, under research grants from the U S Quartermaster Corps, can now be carried out on a low-cost commercial basis with relatively small changes in existing feather-processing equipment, it is reported. The process is a method of treating chicken feathers by which their filling power, warmth and resiliency can be made comparable to those of duck and goose feathers.

The physical characteristics of duck and goose feathers, which are largely responsible for providing good filling power and warmth at light weight, are the stiffness and curl of the quills and the all-around fluffiness of the fibers. Chicken feathers, on the other hand, are straight and flat, and they are easily susceptible to packing, resulting in a relatively small volume per unit of weight. The Keracurl process reportedly imparts curl, stiffness and three-dimensional bulk to chicken feathers so that they permanently assume the appearance and most of the other desirable attributes of the much more expensive and mostly imported duck feathers.

The Keracurl process is carried out by soaking the feathers for a period of one-half hour in a dilute solution of sulfuric acid and alum at approximately 190°F. This solution is then withdrawn and replaced by warm water to which soda ash is added in order to neutralize the feather-water mixture. The feathers are then washed and dried by conventional methods.

An additional valuable use of the Keracurl process lies in the treatment of duck feathers which have been stored in a compressed state for stock piling for a number of years. Feathers which have been stored in this manner lose a considerable amount of their filling power in relation to weight. However, when treated by the Keracurl process, their bulking ability reportedly is restored and in most cases actually increased. It is claimed also that Keracurling improves the water repellency of duck and goose feathers as well as chicken feathers.

Commercial utilization of the Keracurling process is covered by patent applications made by Alexander Smith, Inc. Detailed information on the process may be obtained from A Griffin Ashcroft, vice president of research and development, Alexander Smith, Inc, Yonkers, N Y.



Mt Hope Multibar Expander

• New Multibar Adjustable Expander

A newly designed multibar adjustable expander, designed to remove creases on delicate cotton laces, nets and meshes, and sheer synthetic fabrics without danger of distortion, is now available from Mount Hope Machinery Company, 15 Fifth St, Taunton, Mass.

The new unit reportedly may be installed before any operation, wet or dry, for elimination of creases and for pre-expansion of fabrics so they may be processed at or near finished width. The expansion performed by these units may, in some cases, eliminate the need for tentering.

The assembly consists of three Mount Hope free-wheeling expanders and a 4"-diameter roll mounted in heavily built brackets. Two handles, which may be operated from either side, move the center expander roll up or down to adjust the degree of expansion required.

Mount Hope's multibar expanders are also available with three, five, seven or nine expander rolls depending on the degree of expansion and longitudinal stretch required for the application.

Still other types of Mount Hope adjustable expander units are provided with a drive which eliminates longitudinal tension and limits expansion to widthwise dimension, such as would be necessary on batting.

The streamlined brackets on all the models are said to provide an exceptionally sturdy mount for the rolls and their clean lines reportedly eliminate dirt- and grease-catching areas that damage fabrics. The expanders are mounted in nylon clamps set in capped brackets, which are said to make rotation or removal of the rolls simple.

• Surface-printed Textiles

A combination of new Surface colors and a new application of pigment printing has led to the "Surface-printing" of well over 15 million yards of textiles, it is reported. Colors for the new process were developed by the Warwick Chemical Division of Sun Chemical Corp, Long Island City, N Y.

The new procedure is used with equal success on cottons, rayons and other synthetics, and on various blends of these materials. Draperies are the principal items being printed by the new system, although some bedspreads and dress goods are being done as well.

The process involves the use of surface or relief printing rolls, rather than intaglio or rotogravure cylinders. It is pointed out that, with the new method, a pleasing hand-blocked or screen-printed effect can be achieved in the tens of thousands of yards and at much less cost proportionately.

Collaborating on the initial research effort with Warwick's Textile Department were the Pigments Division and the Color Research Laboratories of Sun Chemical.

• Celluflex CEF

Celluflex CEF (trisBeta-chlorethyl phosphate), Celanese Corporation of America's new flame-retardant plasticizer, is said to have earned prompt acceptance in the fields of textile finishing, resins, plastics, and protective coatings.

A recent development of Celanese research, Celluflex CEF is said to be unusually stable. Its excellent flame-retardant properties reportedly are attributable to the chlorine and phosphorous in its chemical structure.

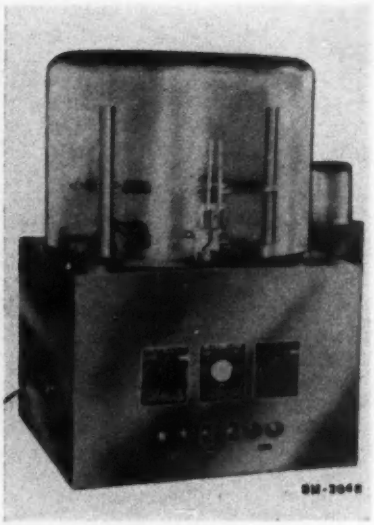
Celluflex CEF is also an effective flexibilizing agent for polyesters, vinyls, and cellulosics, it is claimed. As a plasticizer, it is said to contribute low-temperature properties and ultra-violet stability. Its water-white color enables its use in transparent and pastel-shade items.

• New Naphthalene Derivatives Offered

Millmaster Chemical Corporation, selling agents, and F O Cockerille, manufacturer, (Greenwood, Va) are offering, for the first time commercially, five alpha-substituted derivatives of naphthalene . . . alpha-naphthalenemethanol (alpha-naphthyl carbinol), alpha-naphthaldehyde, alpha-naphthaleneacetonitrile, and alpha-naphthaleneacetamide.

Also from Cockerille, in research qualities, are alpha-substituted derivatives of naphthalenemethanol, such as mercaptan, thiocyanate, sulfonic acid salts, various amines (dimethyl and diethyl—alpha-naphthalenemethyl amine, for example), and a number of esters, ethers, and thioethers.

Samples of both the commercially and research-available groups may be obtained from Millmaster Chemical Corp, 11 W 42nd Street, New York 36, N Y.



Blue M Electric Co "Vapor-Temp"

• Vapor-Temp

Research and testing personnel will be interested in a versatile, low-cost mechanical temperature-controlled relative humidity cabinet known as the Vapor-Temp, a product of the Blue M Electric Co, 138th & Chatham St, Blue Island, Ill.

The unit is said to afford 100% accessability and visibility, with 8-point hermetically sealed lead-in terminals and adjustable air flow. It is suited for short-and long-term tests, including most MIL and JAN specifications.

RH is controlled from 20% to near saturated, at any point, depending upon dry-bulb temperature. Accuracy of wet bulb is said to be within ± 2%; dry bulb, ± 1% from ambient to 158°F (70°C).

The Vapor-Temp uses an inverted Pyrex jar, 1.25 cu ft working area as the work chamber. Another feature is high humidity without condensation on test specimen.

• New Series of Polyethylene Emulsions

Aquex Development & Sales Corporation, Whippany, N J, has announced the commercial availability of a series of polyethylene emulsions, which are said to possess stability and compatibility with thermosetting resins used in textile applications.

Full scale mill runs reportedly have shown improved luster, tear and abrasion resistance on chintz, glazed fabrics, velveteens, plush and pile fabrics, as well as increased pattern-embossing potential on cottons, rayons, etc. The series is said to proved an economical and simple means of reducing the harshness of resin finishes and fulling the hand. It is claimed that no special treatment or aftercuring is required.

• New Direct and Chrome Colors

Several new direct and chrome colors have been announced by Sandoz Chemical Works, Inc, 61 Van Dam St, New York 13, N Y. To their direct colors, Lumicrease Yellow EFUL and Lumicrease Orange 3LG pat were added to the Lumicrease line which, Sandoz feels, represents the ultimate in fast-to-light colors. Both of these colors reportedly have a light fast rating of 7 in both Fade-Ometer and daylight. These new dyes are especially recommended by Sandoz for automotive and decorative fabrics.

Metomega Chrome Orange PML and Omega Chrome Olive GL pat were also recently introduced and added to the Sandoz chrome colors. Metomega Chrome Orange PML is said to have the outstanding light fastness properties of Metomega Chrome Orange ML, while possessing better fastness to cross dyeing and potting.

Omega Chrome Olive GL pat is claimed to be the fastest-to-light dye in the chrome olive category, with a rating of 6 in the Fade-Ometer, 6 to 7 in daylight. It is also said to be fast to carbonizing, fulling, cross dyeing and potting.

• Carobene

Carobene, a modified locust bean gum previously imported from Spain by Buschman Products Inc, is now being manufactured by the firm in this country.

Described as a completely soluble cold-water print thickener, Carobene is a one-package formulation which requires no special equipment for make-ready nor any special method of usage. Mixing or agitation is the same as for other plant thickeners.

The two types now being manufactured vary chiefly in viscosity. Carobene-D, with a viscosity of 9000/10,000 cps in a 4% solution, is said to be compatible with practically all other gums and starches. Carobene-B, with a viscosity of about 20,000 cps in a 4% solution, requires special handling when used with some of the Rapidogens or diazotized types of dyes. Both are fortified with chemical preservatives.

Buschman states that either type will deliver a long-flowing and supple fluid. Each is said to be stable in the PH range of from 2.5 to strong alkaline solutions, even in combinations with starches. The manufacturer claims that print pastes made from Carobene intensify the fixation of the dyestuff while facilitating its penetration into the fabric.

Charts may be obtained from Buschman Products Inc, 369 Lexington Ave, New York 17, N Y, showing Carobene in comparison with other thickening agents, its compatibility with various dyes and its compatibility with presently used adjuvants.

• Refined Polycyclic Chemicals Available from Carbide

Phenanthrene, fluoranthene, and pyrene—three high-purity aromatic chemicals—are now available in sample quantities from Carbide and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation, 30 E 42nd St, New York 17, N Y. It is anticipated that commercial quantities of all three materials will be available by the end of this year.

Until now, purity and availability problems are said to have retarded the development of large-scale uses, but it is believed that the forthcoming availability of these materials will stimulate research and development to take advantage of their unusual potentialities.

Phenanthrene, fluoranthene, and pyrene now are used mainly in the preparation of dyestuffs and pharmaceuticals. They are also used to make fluorescent colors for oils and waxes.

Introductory prices in one- to five-pound lots are: phenanthrene, $2.00 per pound; fluoranthene, $3.00 per pound; and pyrene, $3.00 per pound. These prices are fob Institute, W Va.

Carbide has announced also the commercial availability of Carbowax polyethylene glycol 20M in pellet form. The pellets are white and are said to have a maximum diameter of ½ inch. They reportedly flow freely from the shipping containers (75-lb multiwall bags) and dissolve readily in water in concentartions up to 50 percent by weight.

Carbowax 20M is the newest member of Carbide's series of polyethylene glycols. Its molecular weight is approximately 20,000, the highest of the series, and it has the binding, suspending, and lubricating properties typical of these compounds. It is reported that both melt and solutions viscosities of Carbowax 20M are higher than those of other members of the series and that films from it are stronger and harder.

Carbowax polyethylene glycol 20M is suggested for use in colored pigment suspensions, aqueous-based inks, and other preparations where mild thickening action combined with suspending power is desired. It is said to show promise also as a water-soluble binder in textile and paper starch sizes and synthetic detergent cakes.

• Aerofloc Reagents

American Cyanamid Company has developed a new line of synthetic polymers which are said to have the ability to agglomerate finely-divided solids in liquid suspensions, with resultant improvement in settling and filtration rates.

Aerofloc Reagents, when added to aqueous suspensions, reportedly bond together the individual fine solid particles into flocs. These flocs settle more rapidly than unconsolidated particles, it is claimed, leaving a clarified supernatant suitable for re-use or for discarding without creating a pollution problem. Where suspended solids are removed by filtration, Aerofloc Reagents are said to have improved filtration rates as much as 150% on various types of materials.

Plant scale testing at a New England knitting mill reportedly showed that only 4 parts per million of Aerofloc Reagent caused rapid settling of a textile waste material and doubled the effective capacity of the waste treatment plant, since the settling tank could be discharged more quickly.

A brochure on Aerofloc Reagents is available from Cyanamid's Mineral Dressing Department, 30 Rockefeller Plaza, New York 20, N Y.

TECHNICAL LITERATURE

CHEMIGUM LATEX 236, CHEMIGUM LATEX 246—SMALL PARTICLE SIZE NITRILE LATICES——*Chemical Div, The Goodyear Tire & Rubber Co, Inc, Akron 16, O*——This informative bulletin provides useful information on Chemigum Latex, the family name for a series of butadiene-acrylonitrile copolymer dispersions. Of special interest is a section on "Why Small Particles?". Other features include a list of typical properties, an analysis of properties, a section on Small Particle Colloid Stability, and information on thickening.

GLUCONIC ACID——*Chas Pfizer Co, Inc, Chemical Sales Div, 630 Flushing Ave, Brooklyn 6, N Y*——Booklet No. 33 outlines the uses and properties of gluconic acid, a relatively non-corrosive and nontoxic organic acid made by fermentation. Charts, reactions, derivatives, applications, assay information, specifications, and a number of selected references are included.

The properties of gluconic acid, a polyhydroxy monocarboxylic acid, suggest that it can be acetylated and phosphorylated to yield a number of interesting derivatives.——*12 pages.*

HARDNESS OR DENSITY OF RUBBER-ROLL COVERINGS——*Rodney Hunt Machine Co, Dept IR, Orange, Mass*——Report No. 7 is the latest of Rodney Hunt's series of reports on industrial roll engineering.

The report discusses instruments and methods by which hardness of rubber roll coverings can be determined, and the effect of temperature on rubber hardness and roll use. The report includes a graph that correlates hardness scales for the Plastometer, Densimeter and the Durometer. Photos of the three instruments used in determining rubber hardness are presented.

"LUDOX" AS A SOIL RETARDANT——*Grasselli Chemicals Dept, E I du Pont de Nemours & Co, Inc, Wilmington, Del*——This comprehensive booklet discusses fully "Ludox" colloidal silica, which is designed to fill the soil receptor sites of the substrate in question. The booklet is divided into the following sections: General Information, Extent of Treatment, Process, Method of Application, Materials of Construction, Test Methods, Effect of Improper Treatment, Effectiveness to Commercial Cleaning, Retreatment, Treatment of Upholstery Fabric and the Like, Treatment by Exhaustion, Treatment of Other Substrates, Composition and Properties, Toxicology, Packages, and Bibliography.

WYANDOTTE SODA ASH——*Wyandotte Chemicals Corp, Wyandotte, Mich*——This new 96-page book contains a wealth of product and application information — technical data, sampling methods, tips on handling and storage, etc. Included in the contents are comprehensive chapters on Analytical Methods, Chemical Reactions of Soda Ash, Handling and Storage of Soda Ash, History of Soda Ash, How Soda Ash is Made, Technical Service, Properties of Soda Ash, Research at Wyandotte, Safety Precautions, and Uses of Soda Ash. An Appendix provides useful tables, charts and conversion factors to supplement the text proper.

NAMES IN THE NEWS

Rossiter

Vidal

Lenz

Truax

Wathey

Davidson

Four new management changes to increase promotion of Dow Corning silicones to the textile and leather industries have been announced.

WILLIAM T ROSSITER, Jr, former manager of Leather Industry Sales, has been appointed manager of leather and textile sales, with WILLIS D DICOME as assistant manager of textile sales and ROBERT E VIDAL as assistant manager of leather sales. CHARLES J LENZ, formerly with the Leather Industry Sales Division, has been appointed assistant merchandising manager in the textile and leather industries.

The following changes in the Textile Resin Dept of American Cyanamid Co became effective July 27:

A L LOGAN, former supervisor of the sales service group of the Textile Resin Laboratory, has been appointed to the technical field service. He is succeeded in his former post by L J MORETTI.

R W CASHION has been transferred from the Department's Application Laboratory to its Bound Brook, N J, sales office as a liaison correspondent.

MANNING H BUSFIELD is now directing research application and standardization work at the Plainfield, N J, plant of Peerless Color Co, Inc.

Mr Busfield spent seventeen years as a dyer before his association with American Cyanamid Company's Dyestuff Department, which ended after twenty-one years with his retirement on January 1st.

The following promotions have been made in the Dyestuff and Chemical Division of General Aniline & Film Corp:

EDWARD R HEINTZ has been named manager of the Pigment Division of General Dyestuff Co, a sales division of GAF.

THOMAS B MOORE, JR succeeds Mr Heintz as Philadelphia Branch manager, and, in turn, KENNETH J CAMPBELL succeeds Mr Moore as assistant to the vice president and general manager, S H WILLIAMS.

ERNEST G TESCH has been named manager, dyestuff sales service, succeeding H K SCHWEIGHOFER, who has been appointed market manager, textile dyestuffs.

C B SHOEMAKER has been promoted to staff assistant to GERALD S TOMPKINS, president of American Viscose Corporation. Mr Shoemaker has been assistant manufacturing manager of rayon staple and tire yarn.

RICHARD J GREENE has been put in charge of the newly established Southeast States Technical Field Section, Development and Research Division, The International Nickel Co, Inc, with headquarters at 3179 Maple Drive, NE, Atlanta, Ga.

DAVID E TRUAX has been named director of Stein Hall Co, Inc's, Charlotte, N C, plant and laboratories. Mr Truax, who has been with Stein Hall since 1936, has served most recently as plant manager at Charlotte.

JOHN B WATHEY, formerly chief chemist at Stein Hall's New York Textile Laboratory, has been assigned as chief chemist at the Company's new established Southern Textile Laboratory at Charlotte.

JACK H FIRPO, sales manager for Woonsocket Color & Chemical Co, Woonsocket, R I, has returned from an extended business and vacation trip to France.

While in Paris Mr Firpo visited various customers of the firm, whose representative is his father, HENRY A FIRPO.

JOSEPH G DAVIDSON, vice president of Union Carbide and Carbon Corporation, New York, has been chosen to receive the Chemical Industry Medal for 1955 "for conspicuous services to applied chemistry." Announcement of the award was made on July 17th by the American Section of the Society of Chemical Industry, donor of the medal. Formal presentation of the medal to Dr Davidson will be made at a meeting of the American Section following a dinner in the medalist's honor at the Waldorf-Astoria Hotel, New York, on Friday evening, October 28th, 1955.

DAVID H DAWSON, assistant general manager of Du Pont's Textile Fibers Department, has been elected a director, vice president and member of the Executive Committee of the company. With his election, the number of directors is increased from 29 to 30.

Mr Dawson has been with the company for 22 years. In that time he has had wide experience in research, production and sales in many of the company's departments. He has been in the Textile Fibers Department since 1953, first as assistant general manager in charge of manufacturing and then as assistant general manager of the department. He previously had been assistant general manager of the Pigments Department and of the Fabrics and Finishes Department.

The Textile Engineering Department of Alexander Smith, Inc has been combined with the Research and Development Department with A GRIFFIN ASHCROFT, vice president, directing the work of both.

The Textile Engineering Department was formerly under the direction of L A RUNTON, who has resigned to become affiliated with another nationally known concern.

Mr Ashcroft joined Alexander Smith in 1934 as product engineer. He was appointed director of research and development in 1944, and was made a vice president in 1951.

Coakley

Daly

Ganos

Blackshear

Frazier

Antoshak

News of note from Allied Chemical & Dye Corp includes the appointment of I H MUNRO as vice president of the Solvay Process Division. Mr Munro, who has served as assistant to the executive vice president since 1953, will continue to be located at the New York executive offices, 61 Broadway.

In Allied Chemical's National Aniline Division, CORNELIUS C COAKLEY has been named director of operations, with JAMES F DALY succeeding Mr Coakley as manager of the Division's Buffalo Plant. EDWIN H BEBEE has been appointed assistant engineering manager of the Division.

In his newly created position, Mr Coakley will have responsibility for the general direction of all manufacturing and related activities at the Company's Buffalo, Moundsville, Hopewell and Bermuda Hundred plants. Mr Bebee, who was most recently assistant plant manager at Buffalo in charge of engineering, construction, maintenance and power activities, will report directly to FORREST J KRUEGER, engineering manager, with respect to engineering matters involving all plants and branches of National Aniline.

Messrs Coakley and Bebee will be located at National Aniline's general office at 40 Rector St, New York.

Rodney Hunt Machine Co, Orange, Mass, has announced the appointment of CHRISTOPHER C GANOS as sales engineer in the Southern territory for the company's Textile Machinery Division. He will assist TOM KITCHEN, presently handling equipment sales and service in that area of operations with headquarters at 121 Cleveland Street, Greenville, S C.

Mr Ganos, who joined Rodney Hunt in 1947, has been textile machinery service engineer since 1952.

Appointment of GLEN A NEBEL as west coast representative of Catalin Corporation of America, has been announced. Mr Nebel will make his offices at 440 Seaton Street, Los Angeles, Calif.

Five research fellows of Textile Research Institute have completed their graduate studies at Princeton University and the Institute during the past year. These men have been granted the PhD degree of Princeton University and have been certified by the Board of Trustees of the Institute as graduate fellows in textile research. Most of them have accepted industrial research positions. Their names and thesis research subjects are as follows: DAVID M CATES — "Preparation and Properties of Fibers Containing Mixed Polymers"; THEODORE LEMISZKA — "Stress Relaxation of Fibers as a Means of Interpreting Physical and Chemical Structure"; ROBERT A MARTIN — "The Homogeneous Acid Degradation of Viscose, Hydroviscose and Hydrocellulose in Phosphoric Acid Solution"; LUDWIG REBENFELD — "Study of the Cellulose Methylation Reaction"; and HENRY K WOO — "The Reaction of Formaldehyde with Cellulosic Fibers."

P J WOOD, technical director, Royce Chemical Co, left for Europe on August 3rd on the Queen Elizabeth. He plans to return September 16th on the Mauretania.

Stein, Hall & Co, Inc, has appointed LEWIS BLACKSHEAR as a textile salesman operating from its Charlotte, N C Branch. His prime responsibilities will be servicing of the textile greige mills in South Carolina.

Mr Blackshear served with Charles W Byrd Laboratories, Philadelphia, from 1953-54 as a salesman of textile chemical specialties.

JAMES R FRAZIER, formerly of the Interplant Relations Department, has been added to the sales operating staff of the Chemical Division of the Goodyear Tire & Rubber Co, Inc, Akron, O.

He will assist in processing and expediting orders on shipments concerning Goodyear's raw material chemical products, including Pliolite latices and Plioflex rubbers.

DAVID M CATES has been appointed as assistant director of chemical research in the School of Textiles at North Carolina State College.

In his new capacity, Dr Cates will assist in the chemical research and textile chemistry educational activities of the School of Textiles under HENRY A RUTHERFORD, head of the Department of Textile Chemistry and director of chemical research.

The Hubinger Company, Keokuk, Iowa, has announced the promotion of three members of its bulk sales department.

DELBERT L EDWARDS has been appointed territory manager of bulk sales in Iowa, Nebraska, Missouri, Kansas, Colorado, Oklahoma, Arkansas, Texas, Eastern Tennessee, and Southern and Central Illinois. He was formerly assistant manager of the bulk sales department.

DUANE L TIGER has been promoted to the position of Chicago Branch manager. Mr Tiger, associated with this branch of the company's sales organization for eight years, succeeds GEORGE W HINES.

Assisting Mr Tiger in the Chicago territory will be HOWARD L PEPER, former head of Hubinger's Aviation Department. He has been active in bulk sales work out of the company's home office in Keokuk.

RAYMOND STEVENS, senior vice president of the consulting firm of Arthur D Little, Inc, Cambridge, Mass, is the newly elected honorary chairman of the American Section, Society of Chemical Industry, for the year 1955-1956. Announcement of the election was made by the Section's retiring chairman, CLIFFORD F RASSWEILER, vice chairman of the board of Johns-Manville Corp, New York.

PERRY ANTOSHAK recently joined Howes Publishing Co, Inc as editor of *Hosiery Industry Weekly*, the newsmagazine for hosiery manufacturers and distributors.

Mr Antoshak, formerly news editor of *Gas Age*, succeeds NEIL JOHN HEASLIP, who resigned to take a position with Tappan Stove Co, Mansfield, O.

A 25-year service pin is awarded to H R THIES, right, general manager of the Chemical Division of The Goodyear Tire & Rubber Company, by E J Thomas, company president. Mr Thies has been in charge of the Chemical Division since it was organized in 1948. He was named to his present post January 1, 1954

ROBERT C OTTKE has been named manager of the Development Section, and JOHN K SHAW, manager of the Industrial Section, within Chas Pfizer & Co, Inc's Technical Service Department.

JAMES A McCOUBREY has left the staff of the development branch of the Canadian National Railways to become manager of North American Cyanamid Ltd's newly formed Market Research Department, with headquarters at Toronto.

NOTE

As noted in our issue of February 28 (1955), citations were conferred upon a number of alumni of the College of Engineering, New York University, in connection with the Centennial Celebration of the College.

Among those alumni whose significant achievements have brought distinction to their Alma Mater and themselves were HARRY BENNETT, president of Glyco Products Co, Inc, and C FRED GURNHAM, professor and head of the Department of Chemical Engineering, Michigan State College.

OBITUARY

JAMES O SMITH

JAMES O SMITH, 57, sales representative of the Organic Chemicals Division, North American Cyanamid, Limited, was killed in an automobile accident at Markham, Ont, Thursday, June 30th. His wife, who was driving the car when the accident occurred, was seriously injured.

Mr Smith joined the Toronto office sales staff of North American Cynamid in 1946. He was formerly a sales representative in Canada for the Dillons Chemical Company, Ltd, a dyestuff sales representative in Canada and the United States for E I du Pont de Nemours & Co, Inc, and assistant dyeing superintendent of the Toronto Carpet Co, Ltd.

Mr and Mrs Smith's son, J M Duckett, is a sales representative for the Textile Resin Department, North American Cyanamid, Ltd, in Montreal.

GENERAL CALENDAR OF COMING EVENTS

AMERICAN CHEMICAL SOCIETY

128th National Meeting—Sept 11-16, Coffman Memorial Union, Minneapolis, Minn.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS

National Convention—Sept 26-28, Lake Placid, N Y.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

Mid-Atlantic Textile Conference—Nov 3-4, N C State College, Raleigh, N C.

GARMENT DYERS GUILD OF AMERICA

Sept 9-10, Loebl Dye Works, Roanoke, Va.

THE FIBER SOCIETY

Fall Meeting—Sept 8-9, Massachusetts Institute of Technology, Cambridge, Mass; Spring Meeting—May 2-3, The Clemson House, Clemson, S C.

INTERNATIONAL WOOL TEXTILE RESEARCH CONFERENCE

Aug 22-Sept 9—Sydney, Melbourne, and Geelong, Australia.

NATIONAL COTTON COUNCIL OF AMERICA

1955 Chemical Finishing Conference—Sept 20 21, Chalfonte-Haddon Hall, Atlantic City, N J; 7th Annual Cotton Research Clinic—Feb 15-17, Pinehurst, N C.

NATIONAL COUNCIL FOR TEXTILE EDUCATION

October 17-19, The Larches, Hopedale, Mass.

THE NATIONAL FEDERATION OF TEXTILES, INC

Annual Meeting—Oct 4.

NATIONAL SAFETY CONGRESS AND EXPOSITION

Industrial Safety Sessions—Oct 17-21, Conrad Hilton, Morrison and La Salle Hotels.

NORTHERN TEXTILE ASSOCIATION NATIONAL ASSOCIATION OF COTTON MANUFACTURERS

Annual Convention—Sept 29-30, Wentworth-by-the-Sea, Portsmouth, N H.

PHI PSI FRATERNITY

Annual Meeting—April 19-21, Alabama Polytechnic Institute, Auburn, Ala.

THE QUARTERMASTER ASSOCIATION

Annual Convention—Oct 27-28, Conrad Hilton Hotel, Chicago, Ill.

SOCIETY OF INDUSTRIAL PACKAGING AND MATERIALS HANDLING ENGINEERS

Packaging & Handling Exposition—Sept 20-22, Kingsbridge Armory, New York, N Y.

SOUTHERN HOSIERY MANUFACTURERS ASSOCIATION

Annual Meeting—Aug 25-26, Hotel Roanoke, Roanoke, Va.

SOUTHERN TEXTILE EXPOSITION

19th Exposition, Oct 1-5, 1956, Textile Hall, Greenville, S C.

SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS ASSOCIATION

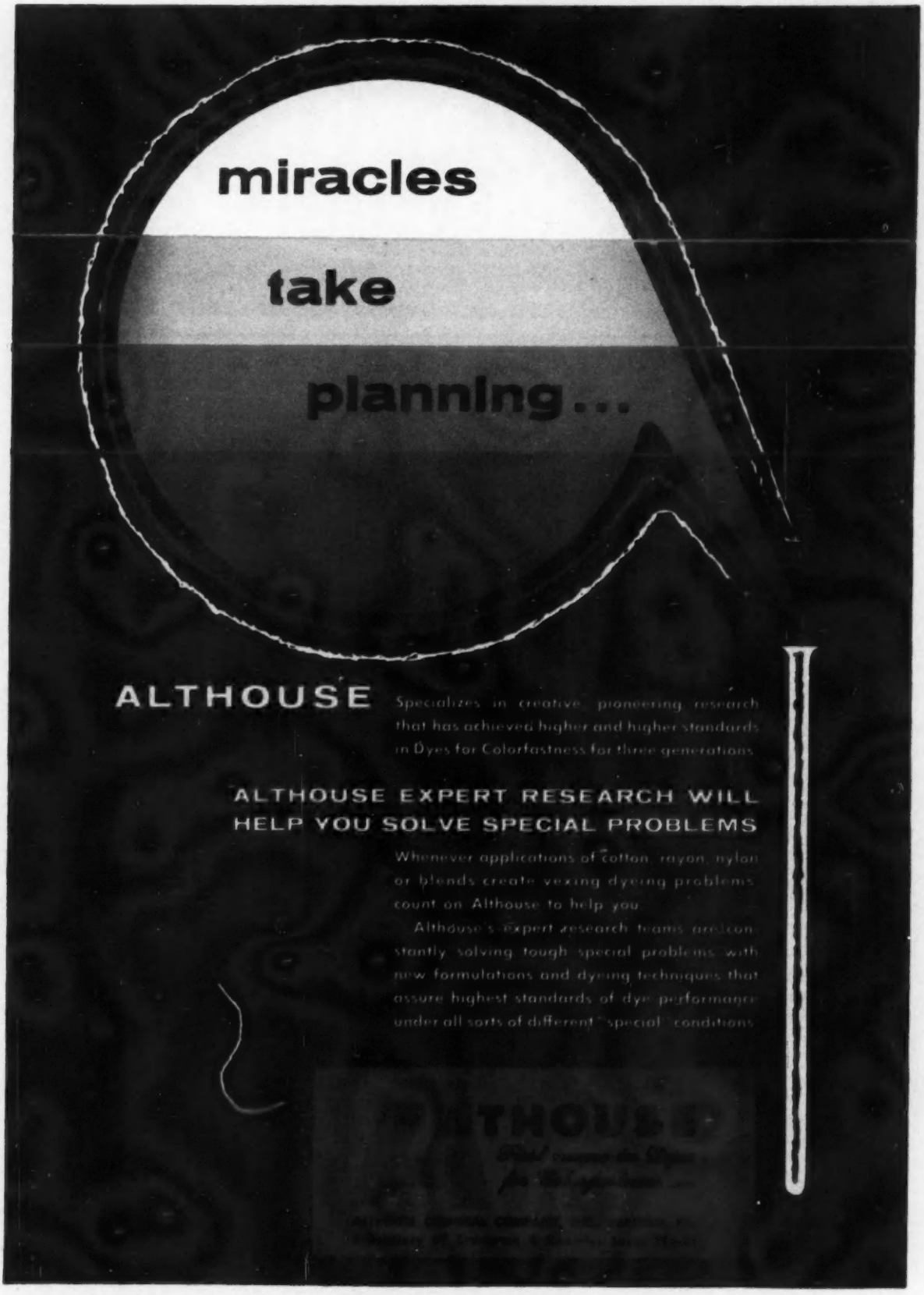
Sept 14, Oct 11, Nov 9 (Hotel Commodore, New York, N Y).

TEXTILE METHODS AND STANDARDS ASSOCIATION

Fall Meeting—Sept 29-30, Clemson House, Clemson, S C.

TEXTILE TECHNICAL FEDERATION OF CANADA

5th Bi-annual Textile Seminar—June 5-7, Queen's Univ, Kingston, Ont.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Specializes in creative pioneering research that has achieved higher and higher standards in Dyes for Colorfastness for three generations
ALTHOUSE EXPERT RESEARCH WILL HELP YOU SOLVE SPECIAL PROBLEMS
Whenever applications of cotton, rayon, nylon or blends create vexing dyeing problems count on Althouse to help you.
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CLASSIFIED ADVERTISEMENTS

Advertisements in this section are restricted to HELP WANTED—POSITIONS WANTED—EQUIPMENT wanted or for sale. Rates, effective February 1, 1951: One-time, $10.00 per column inch; 3 consecutive times (same copy), $9.00 per column inch; 13 or more times, $8.00 per column inch; Position Wanted, $2.00 per column inch. Figure 38 average words per column inch. Publisher reserves the right to reject or discontinue any classified advertisement. Replies should be addressed: Box Number . . . c/o American Dyestuff Reporter, 44 East 23rd Street, New York 10, N. Y.

ABSTRACTING SERVICE—Abstracting and digesting of foreign patents and periodicals. Literature review and special reports in dyestuff and cellulose chemistry. PAUL WENGRAF, 88-36 ELMHURST AVENUE, ELMHURST 73, NEW YORK.

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If you are available for a good position in textiles, it will pay you to have your application in our files. Negotiations are confidential through us.

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Over 55 Years In Business

POSITION WANTED: Production Manager, Colorist, Supervisor, in textile screen printing or allied fields. Customer liaison and business experience. Cost conscious. Will relocate. Write Box No. 876.

POSITION WANTED: Textile college graduate. Chemist. Diversified experience dyeing, finishing, auxiliaries manufacturing. Good administrative background. Age 33. Seeks responsible position plant or technical sales. Presently assistant superintendent dyehouse; plant chemist. Write Box No. 926.

JIG DYER WANTED: Preferably with box experience. Applications will be kept confidential. Fair Lawn Finishing Company, Fair Lawn, New Jersey.

WANTED: Large manufacturer of synthetic resins has excellent opportunity for technical salesman under 35 with minimum of BS in Chemistry (or equivalent). Prefer someone with sales experience in the textile, plywood, or foundry resin field. Permanent position open in Florida-Georgia territory. Write Box No. 943.

POSITION WANTED: An individual with an exceptional combination of plant, laboratory experience, desires technical-executive position with dyestuff, fiber manufacturer, or textile chemical firm. Textile college graduate. Experience includes Dyer, Finisher, Laboratory Director, Manager. Write Box No. 932.

WANTED: RESEARCH CHEMIST. PhD, for research in organic chemistry involving the study of color fastness of dyed fabrics and the development of new dyeing processes. Permanent position in Celanese's growing research laboratories. Please send resumes to—Mr. J. A. Berg, CELANESE CORPORATION OF AMERICA, Morris Court, Summit, New Jersey.

POSITION WANTED: PRINT SUPERVISOR-COLORIST. Extensive experience on MACHINE and SCREEN printing of cottons, rayons and synthetics. Proven ability taking charge of printing and color-shop departments. Age 42. Write Box No. 945.

POSITION WANTED: Supervisor of dyeing and finishing circular knit goods, tricot, piece goods and narrow fabrics. Desires position in sales with progressive organization serving the textile industry. Graduate L. T. I., B. T. C. degree. Write Box No. 946.

Hycar Latex treatment for denim granted Good Housekeeping's guaranty seal

REPLACEMENT OR REFUND OF MONEY
Guaranteed by Good Housekeeping
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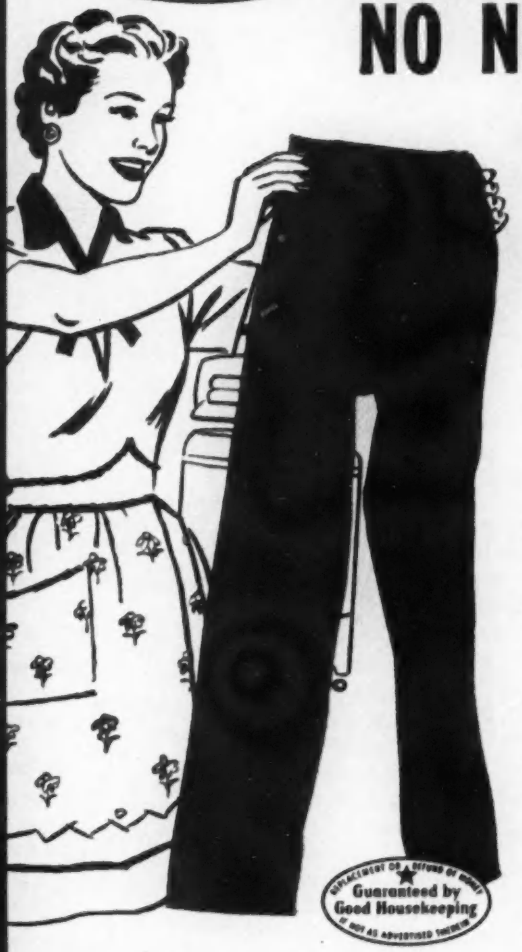


NO NEED TO WASH JEANS SEPARATELY!

New Discovery! **Denim Sized with Hycar Latex Improves Garments 3 Ways**

HERE'S washday news. No need to separate these Hycar treated denims from white articles in the same washer load. There is no color transfer to worry about.

These garments now on sale retain the "new goods" feel and appearance after many washings. And they are never "scratchy".

Jeans made from denim treated with Hycar latex give longer wear than ordinary denim.

Garment manufacturers who use this superior denim carry the information on the label. Look for this label when you buy.

For full information, write to Department CQ-8 B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio for names of manufacturers using Hycar treated denim.

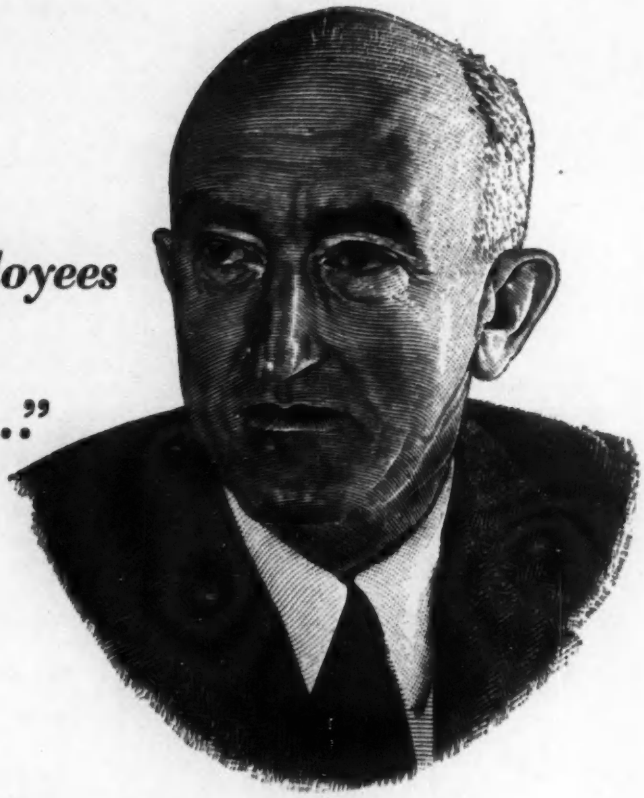
B.F.Goodrich Chemical Company

A Division of The B. F. Goodrich Company

Manufacturers — For full information on the Hycar sizing process for denim, write to the above address.

THIS AND SIMILAR ADVERTISING IS NOW BEING PLACED IN GOOD HOUSEKEEPING MAGAZINE BY B. F. GOODRICH CHEMICAL COMPANY

"Boeing's 59,000 employees feel closer to the company..."



WILLIAM M. ALLEN
President
Boeing Airplane Company

"Boeing's 59,000 employees feel closer to the company since our recent successful person-to-person payroll savings drive in the Seattle and Wichita Divisions. Through letters and personal observations many employees have told us they have a greater sense of being a part of the company—that Boeing is interested in the welfare of each and every man and woman on the payroll."

That's the way it is with Payroll Savers. With the realization that systematic investment in U. S. Savings Bonds is a sure road to the down payment on a home, comfortable retirement, or other objectives, comes a better appreciation of a man's job and his company.

To most Payroll Savers, a day's absence from work means just that much out of his take-home savings. And he no longer takes chances, because he wants to stay off the accident list. He looks for better and quicker ways to do his job—promotion will mean more dollars for Savings Bonds. As a stockholder in America he takes a better interest in national affairs, the sound dollar, and economic stability.

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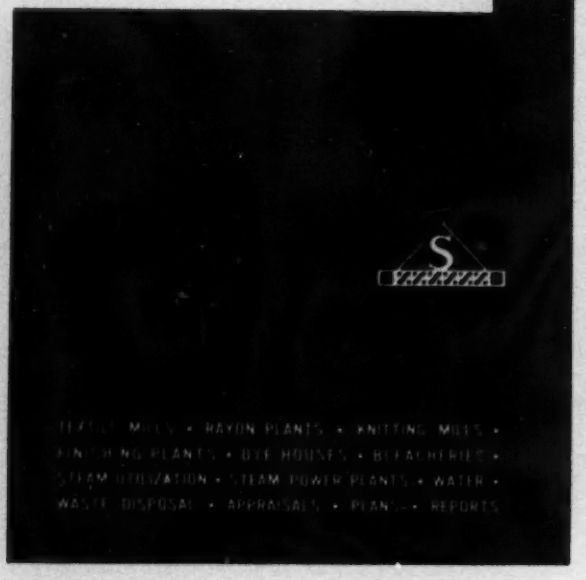
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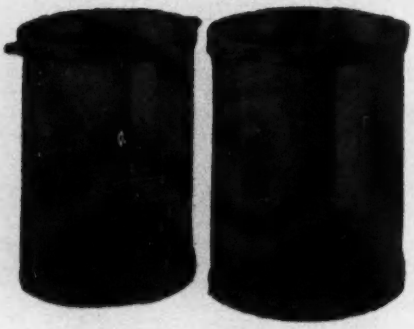

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Cap. Gal.	Dia. In.	Height In.	Each
10	13¼	18	$36.30
15	15¾	18	46.20
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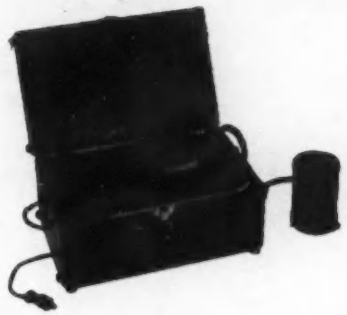

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